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INDIAN CASHEW JOURNAL

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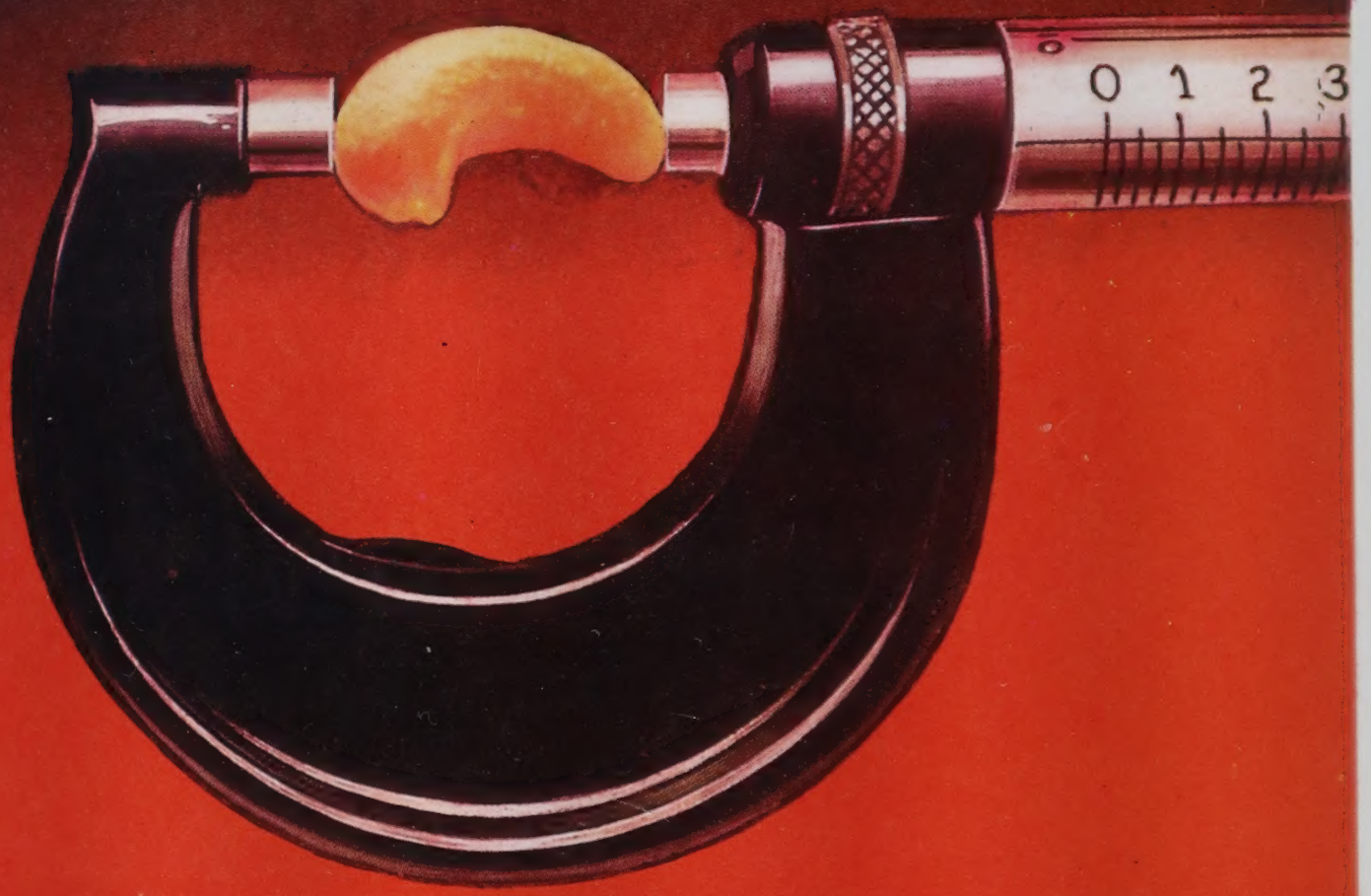
if it's 'KNF' it's perfect



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INDIAN CASHEW JOURNAL

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VOL No. XXIII No 1

THE CASHEW EXPORT PROMOTION COUNCIL OF INDIA

Chittoor Road, Cochin-682 016 India.
Tel : +91-484-361459
Fax : +91-484-370973
Telex : +91-885-6677 CEPC IN
Cable: PROMOTION
E-mail : cashew@ker.nic.in.

Chairman
Mr. T. K. Shahal H. Musaliar

Vice Chairman
Mr. G. Giridhar Prabhu

Chief Executive & Secretary
Dr. K.G. Nayar

Design
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Dr. K.G. Nayar

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Food for thought

Nuts protect furniture too!

With its rare combination of fats, carbohydrates and proteins, the cashewnut is a source of high energy and a snack food of great taste, especially ideal for people on a fast track. Recently it has been discovered that cashews, apart from being a healthnut, has other beneficial properties hidden in it!! Indian scientists have found a solution that uses Cashewnut Shell Liquid (CNSL - a by product of the cashewnut industry) - to form protective coatings for bamboo. Scientists from the Regional Research Laboratory, Bhopal, have recently discovered an innovative technique of protecting bamboo surfaces from corrosive environment by using chemicals based on cashewnut shell liquid. Three surface coatings were prepared viz - CNSL Phenol formaldehyde resin, CNSL epoxy and CNSL styrene resin. Apart from CNSL, other required chemicals are formaldehyde, styrene, hexamine and epichlorohydrin. From the three, CNSL phenol formaldehyde and CNSL epoxy coatings offer more protection than CNSL styrene coating due to their built-in structure.

The surface of the bamboo furniture to be protected are first roughened with emery paper and then a selected coating is applied by brush. The process of coating, drying and recoating continues till the coating becomes 60 microns thick. All the coating compositions are clear and contain a considerable amount of non-volatile matter. In a study to determine the resistance of the coatings, it was seen that the coatings could withstand most chemicals satisfactorily, except for strong acids. The coatings did not crack or detatch from the surface during tests. In a country like India, bamboo furniture forms an integral part of the household. With climatic hazards due to diverse environment conditions, no doubt, CNSL protection is the perfect solution. Researchers earlier have also reported production of fire-retardant paints, pigments and adhesives, corrosion-resistant and water-proof coatings based on CNSL.

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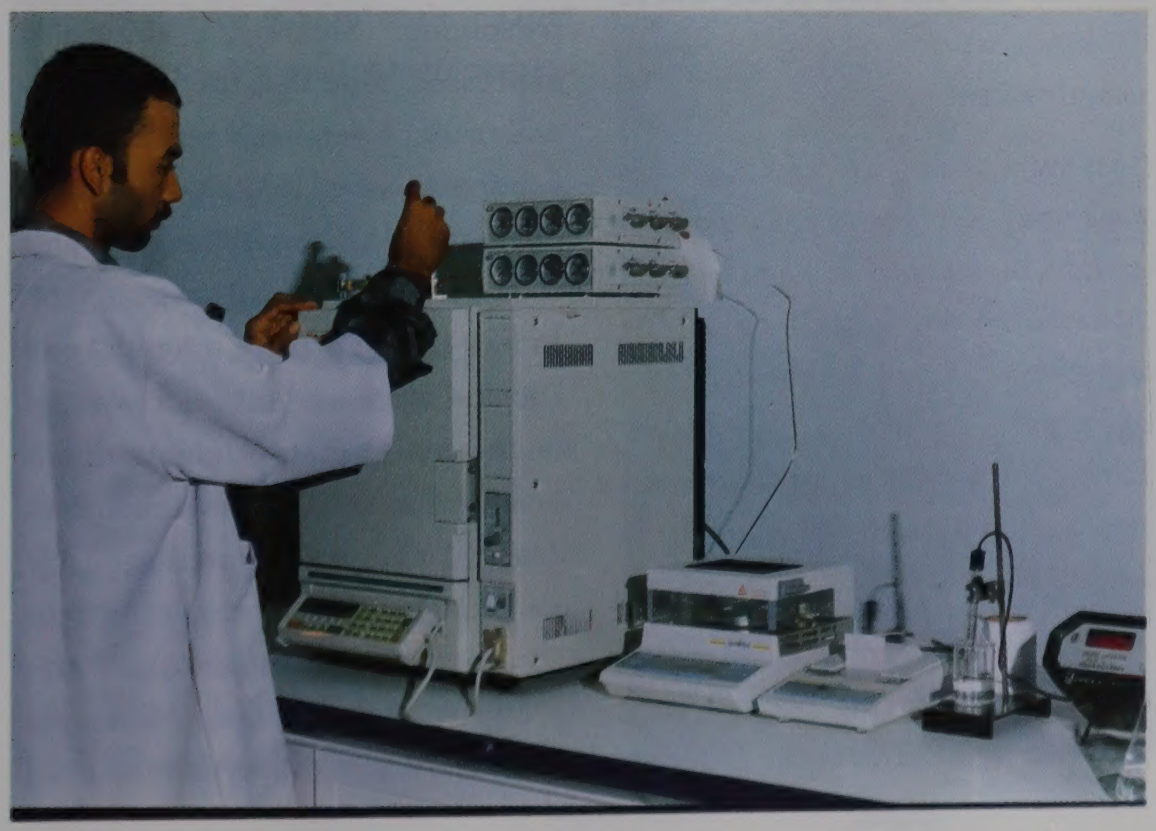
CEPC ESTABLISHES QUL & TCD

Cashew Exports Promotion Council of India has established a Quality Upgradation Laboratory & Technical Consultancy Division at Quilon, the nerve centre of cashew industry. The services of this Laboratory will not only be available to the cashew industry but also to the entire range of food processing industries like fruits, vegetables, spices, seafood, oil, cereals, cereal products, beverages and the like.

The laboratory was inaugurated by Shri P.P Prabhu, Commerce Secretary to the Government of India, on 9th September, 1997 at Quilon. In his presidential address, Shri T.K. Shahal Hassan Musaliar, Chairman, Cashew Export Promotion Council of India, pointed out that the purpose of opening the laboratory was the growing concern for quality among cashew consuming countries abroad.



Shri Giridhar Prabhu, Vice Chairman of the Cashew Export Promotion Council, welcomed the gathering. Shri N.K. Premachandran, M.P., speaking on the occasion, said that the setting up of the Quality Upgradation Laboratory is a crucial move towards Quality Upgradation of food products exported from India.

Offering felicitations, Shri P. Gangadharan Pillai, A. Younus Kunju, K. Ravindranathan Nair and T.S.R. Govindarajulu, members of the Committee of Administration, said that with the inauguration of this laboratory, a long cherished dream of cashew exporters has been fulfilled. They also felt that the laboratory will build up the cashew exports from the country.

Smt. N. Anandavalli Amma, Asst. Director, Export Inspection Agency (EIA), pointed out that this Quality Upgradation Laboratory is the only one of its kind in South India to perform a wide variety of

Quality Control tests for mycotoxins, biotoxins, fumigants, poly chloro biphenyls, penta chloro phenols, bacterial toxins, chemical additives and metallic residues in food items.

Cashew samples for testing at the laboratory were handed over to Shri P.P. Prabhu by S/Shri P. Bharathan Pillai, K. Krishna Pillai, K. Gopinathan Nair and Tariq Musaliar, all members of the Committee of Administration.

Dr. K.G. Nayar, Chief Executive and Secretary of the Cashew Council, thanked Sri P.P. Prabhu, Commerce Secretary, for giving his valuable time to come all the way from Delhi to Quilon to inaugurate the Quality Upgradation Laboratory and also to personally note the problems faced by the Indian Cashew Industry. He also thanked all those who helped to make the function a great success.

Speaking on the occasion Shri P. P. Prabhu pointed out that value-added exports and diversification of markets are the two areas where cashew exporters have to give serious attention.

Cashew is mostly exported in bulk packaging. Only very small portion is sold in consumer packs. The situation, therefore, calls for adoption of new packaging technology to aid export in consumer packs. Diversification of export market is another vital point to sustain our export efforts.

An attractive, eye-pleasing and appealing packaging plays a very vital role in the sales of the product. Steps to tackle such problems would include approaching the Indian Institute of Packaging, CFTRI and such organisations for assistance. Joint collaborations of the Cashew Export Promotion Council with these organisations could ensure cost effective solutions in cashew packaging. Shri P.P. Prabhu also expressed hope that the laboratory will render a yeoman's service to the exporters as well as cashew processing units. In the challenging and changing international environment, India's export growth potential will become more and more dependent on the quality of its products. It has been found that cashew importers are imposing stringent quality norms. The importers have the right to know the contents of the products, its nutrient capablities, the chemicals and preservatives used

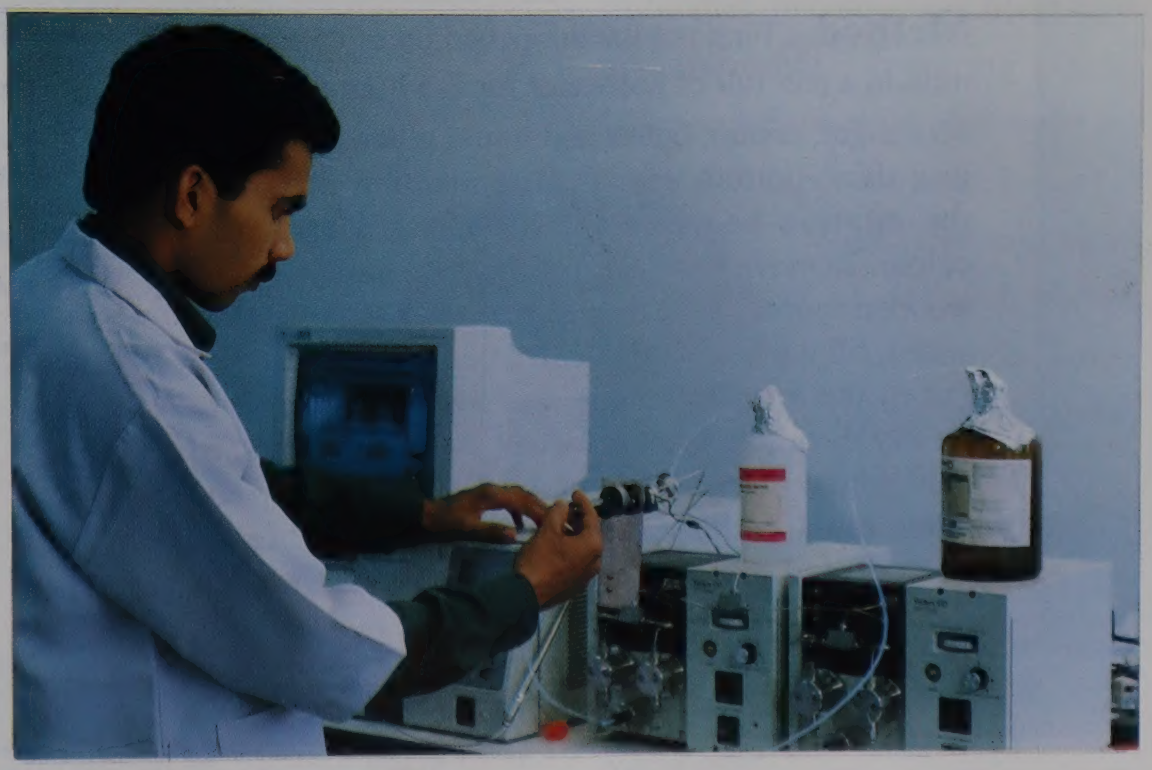
and also the hygiene under which the product was processed. The cashew industry should pay attention to the sanitary and hygienic condition of the processing units. Shri P.P. Prabhu also added that the industry should work out schemes to meet the quality norms imposed by the importing countries by securing ISO 9000 certification and introduce HACCP (Hazard Analysis and Critical Control Point) in processing. The Cashew Export Promotion Council has taken a firm resolution in its relentless pursuit for quality, ensuring that India remains a celebrity in cashew export.

Shri P.P. Prabhu pointed out that our exports have been exhibiting a slackening pace during the last couple of years. The export of cashew which touched $ 397 million in 1994 dropped to $ 368 million in 1995-96 and further to $ 361 million in 1996-97. This calls for the need of improved quality and packing and also to promote exports of cashewnuts in consumer packs and in value-added form.

The Ministry of Commerce, Government of India, plans to actualize several schemes during the IX plan with a tentative total outlay of Rs. 8 crores for Quality Upgradation of cashew and also to reinforce marketing strategies and packaging techniques. The Ministry has already contributed Rs. 76 lakhs as Plan funds. The Central Government on its part has reinforced, several schemes during VIII plan for increasing the production of raw cashewnuts in the country. Plan funds amounting to as much as Rs. 48 crores were granted during the VIII plan period by the Ministry of Agriculture.

The Government, realizing the unique status of the cashew industry, has made tremendous efforts to develop it. Sri P.P. Prabhu further emphasised that the government can only assist the industry. However the main effort should come from the industry.

India plays a vital role as one of the largest exporters and producers of cashew kernels in the global market. But presently, the unrivalled stature is wearing down. The most important reason is that the indigenous production of raw cashewnuts does not meet the requirements of the cashew processing industry. The domestic availablity of cashew is expected to be only around 5 lakh tonnes, but the demand is expected to be around 8 lakh tonnes. There would be a deficit of 3 lakh tonnes of raw nuts by 2001. The Government, in order to build up the domestic availability of raw nuts for export



purposes, has permitted import of raw cashewnuts freely without any restrictions.

Another bleak prospect for import is that raw nut producing countries have started setting up their own processing industry. In addition, many countries have imposed export duties on their raw nuts. These have led to the increase of the raw nut prices, whereby India is facing stiff competition from these countries. All these factors increases the need for the increased production of raw nuts. To realize high values and to achieve acceptance, the most important is the high quality of the product.

Shri Prabhu appreciated the Kerala Government's new scheme of leasing government land to unemployed women workers for cashew cultivation, in association with the Waste Land Development Board, New Delhi and the Directorate of Cashewnut Development, Cochin.

He congratulated the Cashew Council for establishing the Quality Upgradation Laboratory and Technical Consultancy Division. He hoped that the laboratory would upgrade the quality of Cashew kernels and also other food products and set the trend for higher export earnings for India. ●

NUTREAT

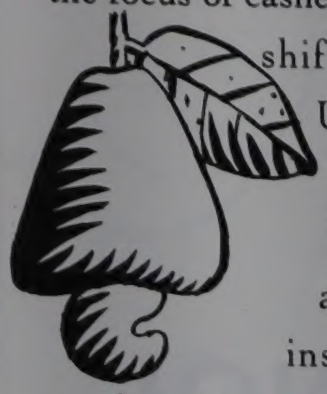
Method : First put the unopened tin of condensed milk in a pan full of hot water for 2-3 hours.

Mix sugar, cream, butter and liquid glucose together in a thick-bottom pan. Boil at medium heat until the mixture becomes thick and light brown in colour. Remove from fire and mix vigorously with a wooden spoon, or use an electric beater at a very slow speed, till the butter recedes to the sides of the bowl. Put in the icing sugar and beat until sugar is completely absorbed. Add the condensed milk and crushed Nuts to the mixture. Take a half-inch high tray and place oiled butter paper on it. Pour in the fudge mixture and cool. Cut into desired shapes when dry.

INGREDIENTS

Sugar	-	300 gm
Cream	-	250 gm
White butter	-	125 gm
Liquid glucose (50 gm glucose powder mixed with in 500 ml water		
Condensed milk	-	100 ml
Icing sugar	-	50 gm

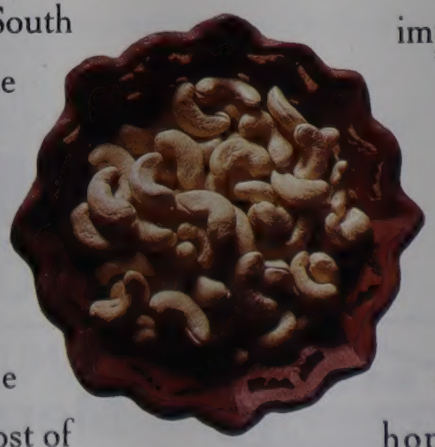
Cashew processing is a major industrial activity, which has contributed to the advancement of the industry. It has been found that the focus of cashew processing has shifted to Quality Upgradation. Cashew buyers, both domestic and international, insist on superior quality. For an exporter to be competitive, he certainly has to maintain the quality, shelf-life and safety of the product.



The existing commercial test laboratories in South India are mainly R & D (Research and Development) laboratories and they do not have the necessary equipment and infrastructure facilities to conduct certain commodity specific and country specific tests. CEPC's Quality Upgradation Laboratory opened at Quilon has the most advanced equipments procured from India and abroad (to undertake tests for Mycotoxins, biotoxins, fumigants, poly chloro biphenyls (PCB) penta chloro

phenols (PCPs) poly aromatic hydrocarbons (PAHs), bacterial toxins, drug residues, enzymes, toxic metallic residues, chemicals, additives, tests as per Nutritional Labelling and Education act (NLEA) etc. The Cashew Export Promotion Council has plans to seek the accreditation from the National Accreditation Board for testing and calibration of Laboratory (NABL) of the Department of Science and Technology, Government of India and similar international accreditation agencies to keep up

the credibility of the laboratory, its testing, and certification. No doubt, the Council's Laboratory will certainly be a boon to South India for upgrading the Quality of agricultural and processed food products for further improving the export from this part of the country. Set up at a cost of Rs. 1 crore, the laboratory will evolve standards for cashewnuts produced in various parts of the world. The Consultancy wing of the laboratory will assist both existing and new entrepreneur exporters for upgrading the standards of their facilities. The technical personnel will guide the manufacturing practices adopted by the processor. The availablity of flexible test equipment should prove significant in enabling cashew exporters to maintain their competitive edge in the international market.



The Cashew Export Promotion Council has time and again proved to be an important link between the cashew importers and exporters with its significant services. It collects, analyses and circulates trade information on a global scale, represents Indian exporters in international trade fairs, especially food and food related ones and publishes promotional literature and periodicals featuring global trade information of interest to importers and exporters. With the opening of the Quality Upgradation Laboratory & Technical Consultancy Division, the Council hopes that India will better its position as a supplier of quality food products the world over. ❑

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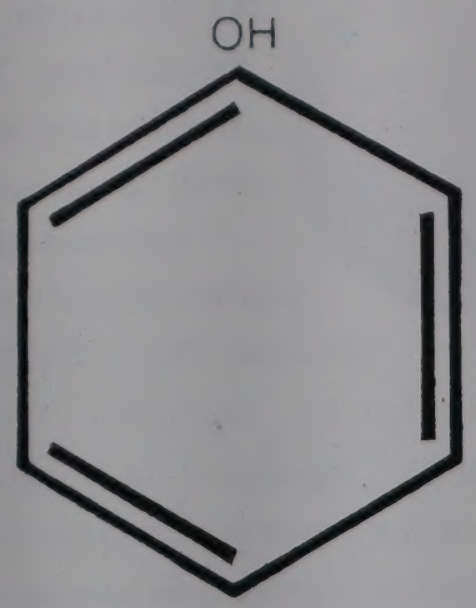

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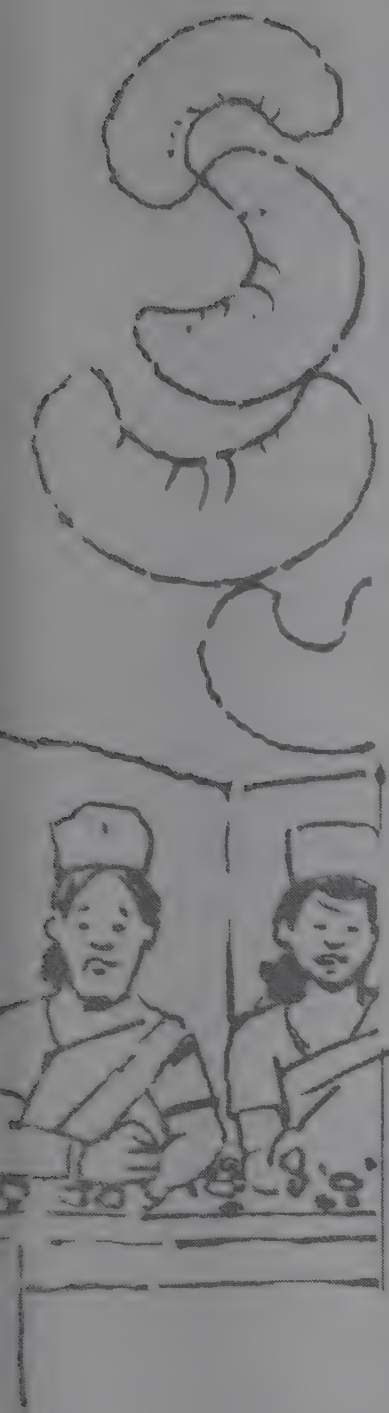
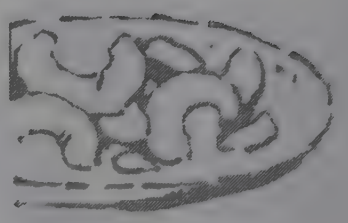
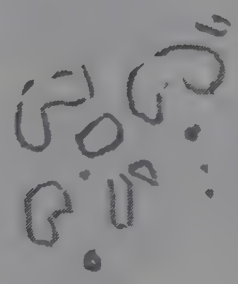


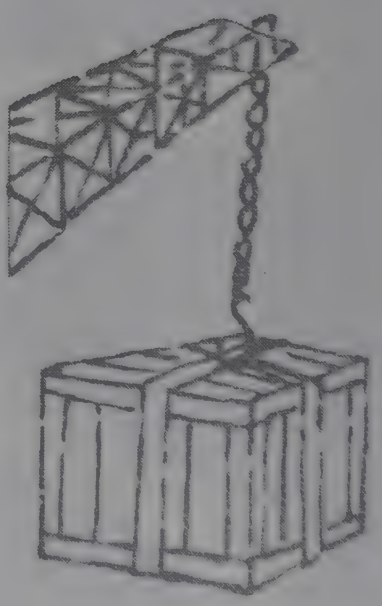
Fine tuning
QUALITY

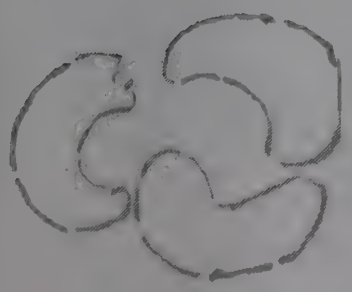
The Quality Upgradation Laboratory and Technical Consulatancy Division of the CEPC has the following objectives and activities.

- Assistance to food processing industries in India to acquire ISO/ HACCP quality system certification.
- Periodical inspection of cashew factories and other food processing units and provide guidance on subjects like cleanliness of the premises , in-process quality control and proper measures for personal hygiene.
- Setting up standards in quality for raw cashewnuts - both Indian and imported.
- Certifying export products like raw cashewnuts, cashew kernels, cashewnut shell liquid and other edible and potable products based on quality control exercised for evaluation. The main considerations in selecting the standards are that they meet buyers' requirements and comply with technical regulations of the importing countries.
- Educating and training factory workers, supervisors and managers in cashew and other food industries on quality maintenance and hygienic processing which can match the international standards of quality, safety and packaging specifications.
- Collecting international quality procedures and techniques and circulating them among farmers, traders, exporters and processors.
- Framing policies and serving as a technology transfer organisation for evaluating quality assurance, production, processing and packaging.
- Providing information on cashew and other food products for exporters in India and importers abroad.
- Offering assistance in studies on improved packaging techniques and analysis and testing of packaging materials in association with the Indian Institute of Packaging.
- Offering assistance in studies on the importance and uses of cashew kernels, cashewnut shell liquid, cashew apple, cashew testa and cashew shells and to evaluate them for its nutritional value under the guidelines set by national institutions like CFTRI, NIN and CSIR.









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Basic Quality Control Concepts as applied to the food industry

General concepts of quality and quality control

Several authorities have defined quality in various ways, but the term generally appears to be associated with "fitness for use" (Juran, 1974) or "the satisfaction level of consumers". The manner in which a service is provided or the state at which food items reach the ultimate consumer may determine this consumer's level of satisfaction. Various concepts of quality applicable to food are described below.

Quality as a composite of product attributes. The "Quality" of a given commodity may be a combination of attributes that contribute to its acceptability. Acceptability in turn is largely dependent on a set of expectations that serve as the consumer's basis for selecting a product. The choice of a commodity therefore rests on characteristics that differentiate it from others. In this context, quality may be defined as a composite of sensory attributes that gives a product its specific identity from the point of view of the user (Kramer & Twigg, 1983). Among these sensory attributes are colour, texture, odour and taste. This definition corresponds to Concepts 1A in figure 1.

CONCEPTS OF QUALITY

CONCEPT 1A
Composite of characteristics/ attributes which differs from unit to unit
(Kramer & Twigg, 1983)

CONCEPT 1B
Totality of features/characteristics of a product that bear on its ability to satisfy a given need (also known as general acceptability)
(Amerine, *et al*, 1965)

CONCEPT 2A
Uniformity, consistency and conformity to a given standard or specifications
(Kramer & Twigg, 1982)

CONCEPT 2B
A statement of what the user wants and what the manufacturers can provide
(Gatchalian, 1989)

CONCEPT 3A
Fitness for use
(Juran, 1974)

Figure 1
The many perceptions of quality as defined by authorities on quality.

Food items are eventually selected on the basis of a person's total assessment of its desirable sensory attributes (Concept 1B, figure 1). However, the actual determinants of choice may be narrowed down to one or two sensory attributes. For instance, people familiar with canned mango scoops (mango flesh halves) in syrup have perceptions of how the product should look, feel and taste. While a mango scoop may meet the requirements for texture and flavour, it may be brown to black in colour and consequently be rejected by the consumer. In the latter's perception, good mangoes must be in the yellow-to-orange-colour range. Similarly, potato chips are generally accepted mainly on the basis of their crispness; a potato chip that is not crisp will not sell, no matter how attractive its colour and how fine its flavour.

These examples serve to emphasize that the perception of quality is relative to the user, who sees the product in its totality, yet reacts to it on the basis of specific sensory characteristics known largerly only to himself.

Quality as consistency in meeting the user's requirements. The degree of consumer acceptance of a product is determined by the extent to which the expected sensory characteristics are observed repeatedly in the commodity. When a food item consistently conforms to the buyer's expectations, that product is considered to be a "uniform" or "consistent" quality, indicating also that the manufacturer has consistently met product standards and specifications. When the expected specific sensory attributes are missing in a food item, it could easily be judged as one of "low" quality; the reverse is true when all the expected attributes are present. (See Concepts 2A, 2B and 3A in figure 1.)

QUALITY AS FITNESS FOR USE

Although quality control authorities have concepts of quality, most agree that product quality can be measured by its "fitness for use" (Fawzi, 1984; Juran, 1974; Rieber, 1983; Sandholm, 1979). A commodity is manufactured for the simple reason that there is a demand for it. People buy things because they have use for them. Such basic items as spoon and fork are continually made because people use them constantly. As long as the spoon can safely convey food to the mouth, the user will generally be satisfied and will consider one of the many variations available as fitted for this particular use.

A more complex but also basic product such as a food item will have as many variations as there are tastes. For this reason, any food product will obtain different assessments of its "fitness for use" and therefore of its quality level. A food item will have as many quality characteristics as there are people who evaluate it. However, for as long it fits the use for which it was produced, it will continue to be in demand, provided that it further is sold at the time it is needed and at the price people are willing to pay.

The degree to which the consumer's need is satisfied is a measure of his perception of a product's quality. If a product manufactured by a company continually meets the consumers needs, that product gains integrity and the users' confidence. This is why brand names get associated with "quality" or the lack of it.

Whether quality is defined as a composite of desirable characteristics or as fitness for use, it is measured in terms of consumer satisfaction with the product. This in turn can be gauged from the number of repeat buys. Therefore, when a commodity has been known to have provided consumer satisfaction through time, producers must strive to maintain the characteristics that have made it acceptable.

OTHER WAYS OF DESCRIBING QUALITY

Quality is a concept that connotes different things to different people. To consumers, it is popularly associated with products of a high standard of excellence. Thus, a fast-selling brand of rum may be described as being of 'extra special quality". Other products such as shoes, cigars or beer may be associated with "export quality" and are shipped abroad for foreign consumption.

Quality is thus a relative perception and is always pegged to expectations based on past experiences. From the consumers' point of view, for as long as the product gives them the same level of satisfaction from one purchase period to another, that product is of good quality. Others compare a local product with an imported item and invariably conclude that an imported product is better than the locally made one. In most instances, product assessment is a comparative process. But where there is a seller's market (i.e., when demand exceeds supply), quality may simply be equated with availability.

Some consumers may gauge quality from the viewpoint of brand popularity (the well-known compared with the unknown.) It is the known and tested product that normally gets a positive consumer reaction; a premium is placed on the prestige or reputation of either the product brand or the manufacturer.

From the producer's point of view, quality could also have varied meanings. To large manufacturers who are fully aware of the prestige of their name and the implications of product failure, quality means product reliability. This has to do with the consistency with which the product can provide satisfaction to the user from one use period to the next. Product reliability may not be the concern of small producers making goods that are in demand regardless of variations in characteristics; for as long as the product sells at the price set for it, these producers remain in business. This mental set many continue until a significant volume of the products rejected. This rejection may open their eyes to the need for reliability.

QUALITY CONTROL (QC)

Manufacturers may suddenly find themselves on their competitive toes when another producer with a similar product enters the market. Observations of consumer reactions may show that the new product has better consumer appeal. Further investigations may reveal that the producer is also a small-scale food processor but one who understands the concept of quality and is a strongly motivated quality-control practitioner. Such a producer will have a competitive edge on the market and could outperform older suppliers in no time.

A product currently in great demand could also be supplanted by a new product of equal, but more consis-

tent, quality. Sometimes a new producer may be so effective a quality practitioner that he is able to reduce production costs and thus to sell at a price lower than his competitors.

It is important that a given commodity should provide the consumer with a consistent level of satisfaction. This consistency is often the result of efficient quality control during manufacture. In short, the consistency of consumer satisfaction has much to do with maintenance of product quality from one production run to the next.

It should be emphasized that it is the responsibility of the manufacturer to know, understand and build the consumer's quality requirements into the product, whatever these requirements may be. The final judge of a product's acceptability is the consumer himself and his repeated buys indicate the extent of his satisfaction with a product. Maintenance, therefore of a commodity's quality level, becomes a very important criterion for an efficient quality control operation.

Quality control can simply be defined as the maintenance of specified finished product characteristics every time it is manufactured. This implies efficient control of raw materials and of production processess. Harrington (1986) states that "quality control is doing things right the first time and every time". This statement (see figure 2) can be posted in the processing plant to serve as the plant's quality motto. The motto implies that errors in the selection of raw materials and in processing should be avoided to prevent defects occuring in the finished product. Meeting raw-material

QUALITY CONTROL IS DOING THINGS RIGHT

THE FIRST TIME AND EVERY TIME

(Harrington, 1986)

specifications as well as process requirements at all times results in the maintenance of product quality and stops the product from the being rejected owing to varying characteristics.

TOTAL QUALITY CONTROL (TQC) AND THE ROLE OF MANAGEMENT

The general function of quality control is to maintain a product's fitness for use. The manufacturer's major concerns are : the prevention of product defects, improvement of product quality, provision of an effective QC programme, and development of an efficient quality monitoring system. The emphasis is on the manufacturing operation itself and the integrated use of men, materials, methods and machines (the four Ms). Efficiency in the use of the four Ms can be more easily accomplished under a TQC system.

Where a QC system is already in place, coordination of all activities in the company could be initiated under the TQC approach. For this approach to succeed, two things are assumed : that a good organizational structure for QC activities exist and that both the management and the workers are motivated to accept new responsibilities for improved work relationships.

NATURE OF TQC

The essence of TQC is the encouragement of the worker's participation through proper motivation and the sharing of responsibilities and successes. Employees, regardless of rank, status or work assignment, are made to realize the importance of their individual contributes to the company's efforts to attain product quality and increase productivity. Interpersonal relations within a company have a bearing, direct or indirect, on the quality of its products. Building quality into these products becomes the concern of everyone in the organization under TQC. Thus, whether one is a janitor, salesman, operator, supervisor, manager, president or owner, he has a role to play in the manufacture of a given product.

TQC requires the efficient coordination of the activities of all employees. To this end, personnel education and training for quality plays a major role. It is important that the company's vision of quality is fully defined and discussed with the employees. Motivational and skills development programmes are essential. Two concepts are usually emphasized in motivational programmes. The first, the "external customer", refers to the product's end-user or the one who obtains the goods outside the company; the second, the "internal customer", is the employee who receives the output of another employee in the course of the company's operations. For instance, the secretary's "internal customer" is his/her immediate boss; likewise, the person receiving products from a previous operation is an "internal customer". Acceptance of one's role in providing the best service/product to his "customer"

could lead to improved interpersonal relationships and thus provide a solid base for sustained TQC. Good interpersonal relations can resolve problems before they grow bigger and more complex.

Synchronization and integration of all organizational activities are essential to TQC. This integration can perhaps be more easily achieved in small companies, where direct communications between managers/ owners and employees are usual. Follow-through activities can therefore be more speedily implemented and sources of friction can be more easily removed.

TQC in the larger manufacturing firms is a more complex affair. Communication gaps are more common and individual employees may be unable to understand their responsibilities in regard to product quality. There is also the danger that top management may alienate itself from the rest of the company, leaving contacts with rank-and-file staff to supervisors. Furthermore, top management may concern itself only with a few vital considerations, leaving some management areas unattended. This could result in the failure of the TQC approach.

APPROACHES TO TQC

For TQC to succeed, the concept of operational self-control must first be fully understood and properly implemented. Self-control is concerned mainly with the application of QC methods by both production personnel and staff in the QC departments. This contrasts with the usual practice of complete dependence on the QC department on quality control matters.

QC DURING PRODUCTION

The practice of quality control by the production group is a form of self-control; it makes use of production controllers who are themselves operators in the manufacturing areas. Some important considerations in production self-control are listed below.

- The manufacturing process must have been proven through time to be truly suitable for the quality requirements of the product concerned.
- The responsibilities of the production controllers must be clearly defined and the limits of these responsibilities fully understood.
- For the production controllers to be effective in the performance of their functions, they must have full knowledge of the QC requirements and of the location of quality control points.
- Operators and workers must know where and when to take precautions against possible errors in the production process; they should be able to tell whether QC requirements have been or are being met.
- Production personnel, specially operators, whose major responsibiliy is to meet production targets, should not see the company's quality objectives as obstacles to the attainment of these targets. For this reason, it is important that they are continually provided with feedback on their influence on product quality.

It is obvious from the above that TQC can best be realized if the company personnel identify themselves with company objectives rather than with personal goals.

QC IN THE QC DEPARTMENT

When QC is associated only with the QC department, staff in this department run the risk of being regarded as "policeman" with the task of uncovering production errors and finding someone to blame. This approach has invariably strained relationships between QC and production personnel. By contrast, TQC accelerated cooperation and commonality of goals. Both production and QC personnel work harmoniously towards the attainment of projected volume of output at the desired quality levels.

Under the TQC system, the following steps should be taken:

- Define QC objective and quality targets to make measurement of success possible.
- Make personnel understand the goals of QC practices in the company through discussions, workshops and other means.
- Quantity quality improvement goals without necessarily increasing production costs.
- Train personnel in efficient quality monitoring.
- Develop with the staff methods for gauging the product's comparative quality level in the market place.
- On the basis of quality objectives, design and then prioritize quality improvement programmes. Special attention should be given to:
- Personnel training needs in relation to their current capabilities and the company's future requirements.
- Management policies on

decision-making activities in connection with quality matters.

A study of the status of the product within the company and in relation to its competitors on the market.

- When priorities have been set for quality improvement programmes, facilitate implementation by:
- Realigning QC improvement programmes with overall company directives. Management support is crucial at this stage.
- Developing methods of measuring changes in quality level at a specified time after the initiation of the programme. Among the items to be monitored are changes in product reliability and availability at the volume required and at the time desired.
- Providing adequate support materials such as a manual on management policies on quality in general and a manual of specifications for the QC department.
- Preparing methods for the continual assessment of quality control practices.

THE ROLE OF MANAGEMENT

The quest for quality essentially consists of a cycle of activities which should be fully understood and supported by management. The development of a QC system in an organization is largely dependent on management commitment and support. The extent to which management lends its support to QC programmes may be determined by the degree to which it believes in quality. figure 3 presents the three major steps to quality control. The

STEPS TOWARDS QUALITY CONTROL

STEP 1	Sell Quality Control to Management
STEP 2	Analyse Company Status
STEP 3	Programme for Quality Control Implementation

first step requires selling the idea of quality control to management. Quality control is not consciously practised in many small food processing firms in developing countries. There is a need to convince management (the owners) about the importance of quality control.

One way of opening the eyes of management to the importance of quality control is by analysing the effect of company practices on product quality. An assessment of the volume and value of products rejected, reworked or returned can provide quite a shock. The measurement of company losses over time as a result of poor products can stimulate interest in quality improvement. Finally, comparing the company's performance with that of a successful competitor should instill a desire to improve.

Management awareness of the need for quality improvement should lead to the implementation of a QC programme or the improvement of an existing one.

THE SIMPLE QUALITY CYCLE

Figure 4 shows how quality specifications can be developed on the basis of consumer preferences. A food manufacturer decides to manufacture a product on the basis of his knowledge of consumer needs. In fact, these needs or preferences are used to develop the specifications which serve as a guide to product development. A product profile, i.e, a description of the product's critical sensory characteristics in quantitative terms is evolved with the aid of sensory evaluation methods. For instance, if banana chips have been identified as a food item desired by the customer, a descriptive and quantitative assessment of the characteristics desired by the consumer should be made. This assessment or product profile, would cover the chips's colour, odour, taste and textural properties.

A food processor should realize the importance of the critical attributes of a food product described in its profile. For banana chips, crispness (a textural property) in addition to odour and flavour may play a major role in consumer acceptance. These attributes should be carefully studied during product development and, if possible, some methods of measurement should be employed. This could lead to a choice of test procedure to determine the existence of the desired product quality. Such procedures could later be utilized as a guide to the selection of a quality control tests for monitoring critical quality characteristics. Data obtained from the tests should

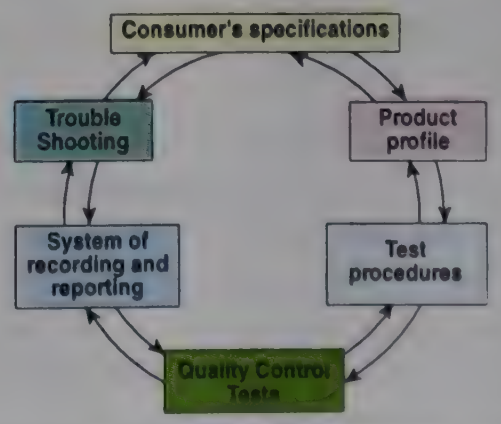


Figure 4 - The quality development cycle (Gatchalian, 1989)

be recorded. When trouble associated with product defects occurs, the cause can easily be pinpointed from the data record. Occasionally, a good reporting system can prevent the occurence of problems associated with quality defects. Consumer complains about products they have bought are examples of trouble for the manufacturer. They should be avoided, but if they do happen, a good recording system can help trace the cause.

The arrows in figure 4 move in both directions if only to emphasize the point that, in a quality development cycle, a product is manufactured in response to consumer needs. The product is either accepted or rejected by consumers. Through the quality development cycle, one can trace the reasons for a product's rejection by simply reviewing the records of test results or of the procedure used to measure product attributes. For the cycle to be fully operational, management has to provide the right organizational structure and climate for its implementation.

THE PLACE OF QUALITY CONTROL IN THE ORGANIZATION

The quality development cycle can be applied to any size of firm. Implementation will differ from company to company and particularly between a large company with complex operations and a small firm.

Figure 5 shows the different organizational structures in three types of enterprises of varying sizes. Observe the position of the QC function in all the structures and note the changes in its position in the structure as the company grows larger. In a small firm, QC is merged with all the other responsibilities of the owner. As the firm increases in size, QC is separated from production operations. Quality control is practised to a certain extent even at the cottage (Type I) and small (Type II) enterprise levels. The controls applied to these levels could be a secret known only to the entrepreneur -owner who doubles as manufacturer-supervisor and quality controller. In larger firms, assignments are more specific. However complex their organizational structure, companies with clear understanding of the importance of quality control generally separate the functions of quality control from that of production though both may be placed under one operation or manufacturing head.

The quality development cycle is of use to any company whatever its size. The management group which does not appreciate the utility of the cycle may be inattentive to consumer reactions to the company's product. Taken together, individual consumers play a major role in a product's survival on a competitive market. It is never wise for a manufacturer to ignore consumer requirements. Providing users with goods consistently meeting their specifications assures repeat buys. By contrast, supplying products of varying quality will certainly bring about the loss of consumer confidence. A manager who does not understand and apply the quality development cycle will be unable to expand his business. The cycle is of utmost importance to the continued success of his manufacturing operations.

MAJOR QUALITY CONTROL FUNCTIONS

There can be as many perceptions of quality control as there are people who think about it. But, as stated earlier, there seems to be a consensus that product quality is measured by its fitness for use. The maintenence of this characteristic to a given degree of consumer satisfaction is generally known as quality control.

Quality control may be carried out either as an inspection function or as an integrated company activity. Each of these have been practised consciously or unconsciously, by many firms. The implications of each approach are discussed below.

QUALITY CONTROL AS AN INSPECTION FUNCTION

Some manufacturing firms view quality control as simply the production of goods with the least number of defective items. Variations between items are tolerated for as long as these do not detract from the functions for which they have been produced. Quality control consists simply of sorting out defective raw materials and defective finished products at the end of the production process. Those who use this practice believe that if the manufacturing process is carefully followed, the finished products will generally be good and defective items can be sorted out by inspection. The extent of this practice varies with the size of the plant, as discussed below.

INSPECTION IN SMALL AND MEDIUM-SIZED PLANTS

Observations show that the smaller

COTTAGE INDUSTRY (TYPE I)

General Manager — Production — Quality Control — Supervisor — Sales/ Marketing

SMALL ENTERPRISE (TYPE II)

General Manager/ Proprietor & Quality Controller

Production workers | Sales & Marketing | Purchasing

MEDIUM - LARGE SIZED ENTERPRISE (TYPE III)

President

Vice-President Administration | Vice-President Manufacturing | Other Vice-Presidents Marketing, etc.

Production Manager | QC Manager

Figure 5 - General organizational structure in three types of enterprise

the company, the greater its dependence on inspection as a tool for judging a product's "fitness for use". Raw materials are accepted from suppliers regardless of whether they meet requirements. Subsequently, unsuitable materials are sorted out and utilised for other purposes or are simply discarded. Sorting in cottage industries is carried out visually by an experienced sorter; no tools or sampling methods and scientific sensory evaluation techniques are used.

Depending on the nature of their products, most small and medium-sized plants use inspection procedures for raw materials similar to those employed by cottage industries. Some of the more technologically advanced firms in this size category may have some access to instrumentation; in general, however, raw materials are sorted visually, with or without the aid of statistical tools.

During the processing stages, quality control takes the form of visual assessment. Some products may be sampled at specific production stages and processing changes may be decided upon by the operator if experience has shown this to be necessary. However, for most small and medium-sized plants, it is more usual for assessment to be carried out on the finished product.

In most small plants, inspection is the only means used to control quality and, when it is carried out at the end of production run, it is considered a way of preventing defective products from being released for sale. The smaller the volume of production, the greater the chances of identifying defective items. Many small firms relying only on this method of quality control have boasted of their success on the market, to the extent that new approaches are of no interest to them. however, a closer look at many of these firms will show that they have remained small through the years.

INSPECTION IN LARGE PLANTS

Most large plants are either highly mechanized or are in a position to hire food technical people. They have easy access to up-to-date technological information, as well as to the services of consultants or experts. They often have effective organizational structures and broad-minded management teams who are deeply concerned with product quality. While they may regard inspection as an important tool, especially in quality control, they realize that more modern approaches are required for the quality assurance essential for volume production. Reliance mainly on inspection during production or at the end of a production run would in their eyes be a major error.

DISADVANTAGES OF INSPECTION

Although inspection is an age-old practice equated by some with quality control, modern technologies view this practice only as a tool for some stages in quality control. "Quality cannot be inspected into the product, it must be built into it right from the beginning " (Juran 1974). No amount of inspection can restore the quality lost during the production process. When inspection is used as basis for raw-material control, its function is limited to indicating whether an incoming supply is acceptable. When it has no effect on the purchasing decision, i.e. defective items cannot in any case returned to the supplier, inspection simply results in the sorting out of imperfect supplies. Production costs would thus rise to include the costs of inspection and the costs of defective materials. Unaware of this, many small firms continue to use inspection procedures and frequently relate their production output only to the costs of the raw materials sorted in. The exclusion of the costs of defective items could give rise to loss-making price calculations.

Inspection at the finished product stage is only a final assessment of processing efficiency. While inferior goods may be sold as seconds or be sent back for reworking, the initial cost of producing them cannot be offset. While defective items costs as much to produce as the good ones, they cannot be sold at the same price. Seconds by definition sell at discounted prices; reworking simply adds to the initial production costs. The greater the volume of production, the more difficult the inspection process and the greater the risk of releasing defective products to the market.

To recapitulate, the inspection should never be equated with quality control. It is only a means of identifying items that do not meet specifications before during or at the end of a production run. Except indirectly, it cannot build quality into a manufactured product. ❑

Quality control may also be viewed as an integrated function. From this viewpoint, it consists of such activities, as prevention, planning and monitoring (PPM) (see figure 6).

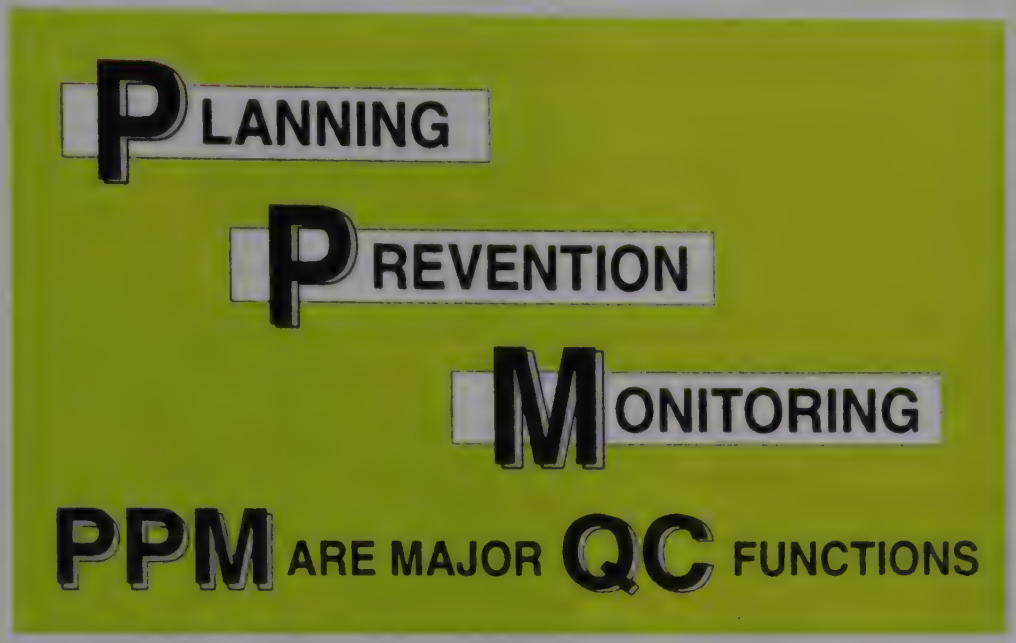
Quality control as an integrated function

PREVENTION

"An ounce of prevention is worth a pound of cure." This adage aptly describes a QC function. By its very nature, the manufacturing process is sequential. Each stage of the process adds to the cost of the finished product. A defective product is unsaleable and will not obtain the expected returns from the costs of producing it. It is thus a major QC function to try to prevent the occurance of defects at any stage of production. This is achieved by assessing production methods and understanding their critical points. rigid attention to raw-material specifications and to in-process requirements is essential.

Many authorities believe that successful quality control should be geared mainly to prevention. Poor raw material should be prevented from being accepted, inappropriate technology should be prevented from being used and defective finished products should be prevented from being released to the market.

Stopping the manufacturing process when one stage is identified to be in error will obstruct the production of a defective item. Making the necessary adjustments at the early stages of the process when error is observed will likewise bar the release of low-quality goods. It is wise to remember that a finished product bearing a defect caused by a process error may find its way to a disgruntled user who will quickly communicate his dissatisfaction to many others.



Despite the need for quality control as a preventive mechanism, many manufacturers fall to use it. This is probably because this mechanism requires much planning and vigilant monitoring.

PLANNING

In many manufacturing process, men, materials, machines and methods, the four Ms, need to be efficiently integrated. A process cannot be made smooth unless each of the four Ms is utilized to achieve a specific goal. The direction to be taken must be made clear and there must be a thorough understanding of the approaches to be utilized. None of these is possible without efficient planning.

If the goal is the maintenence of certain product characteristics and thus to provide constant consumer satisfaction, a formal plan for the network required to achieve this goal must be set up. The plan must cover the entire production process. The sophistication of the plan will depend on the complexity of the manufacturing set-up.

A major consideration in planning for QC is the programming of plant activities. How is the plant to be organized? Where is the main QC function to be located in the organization? what is the management policy on quality? The organizational structure will depend on this policy and the manpower of the plant. What is important is the clarity with which management presents its quality goals to its staff. All the QC tools required must be provided.

A blueprint of the QC plans must be thoroughly studied by management. An objective assessment of the manpower available and its capabilities is of extreme importance before realistic expectations can be mapped out. A study, therefore, of the available manpower must be undertaken. It should be emphazised that it is the men who make all the other Ms functional.

Next, an evaluation of the existing machines should be carried out in relation to the identified goals.

What are their good points, their shortcoming? Is the company in a position to invest in additional machinery and instruments if required?

What are the material requirements for the projected volume of production? Is there a need for product improvement, development? How can the combination of manpower, machinery and materials be made fully compatible with the methods identified as desirable? Are changes in methods necessary? Is there a need to develop new approaches to quality control?

Planning will definitely provide much of the information required to maintain quality. Each step in the manufacturing process will be reviewing from the point of view of its effects on the quality of the final product. Planning is therefore of utmost importance to any QC programme.

MONITORING

The success of a QC programme is determined to a great extent by the efficiency of the monitoring systems. Monitoring can be described as the activity concerned with the objective assessment or follow-through of the QC programme. The maintenence of a product's fitness for use is assured through an effective monitoring system. The prerequisites for a successful monitoring programme are the following:

- A well-defined target or goal based on consumer requirements, i.e., identification of the product characteristics desired by potential end-user:
- Qualification of the identified attributes with the aid of sensory evaluation methods and psycho-chemical tests:
- Effective utilization of men, materials, machines and methods;
- Continual assessment of the results of implemented activities against expectations.

It needs to be emphazised that if the company is not organizationally structured for quality control, the monitoring system will fail. ❑

(Quality Control for the food industry, International Trade Centre (UNCTAD/GATT)

THE HEALTHY WAY TO MAN'S HEART

For a a diet to be well-balanced, it should have a dominant level of monounsaturated fat and relatively low levels of satured and polyunsatrated fats. Cashewnuts are perfectly well-balanced in fat composition. The ratio of monounsaturated fat no saturated fat is about 4 : 1. The ratio between the saturated fat and polyunsaturated fat is also well-balanced at approximately 1 : 1. The Mediterranean diet groups NUTS with fruits, vegetables and legumes as part of a healthy daily diet. This diet is high in monounsaturated fats but low in saturated fats.

Research on dietary fat from the renowned Framingam heart study therorizes that intake of fat might lower the risk stroke. Data from 832 men who participated in the Framingham study for 20 years, were examined by researchers at Harvard Medical School and Boston University. It was found that for each indent 3% in total fat intake, the risk of a stroke declined to 15%. However scientists from the American Heart Association warns that people shouldn't start taking dollops of fat. The Framingham study only included men who were free form heart disease at the outset. It needs to be confirmed by much larger studies including both men and women in other age groups.

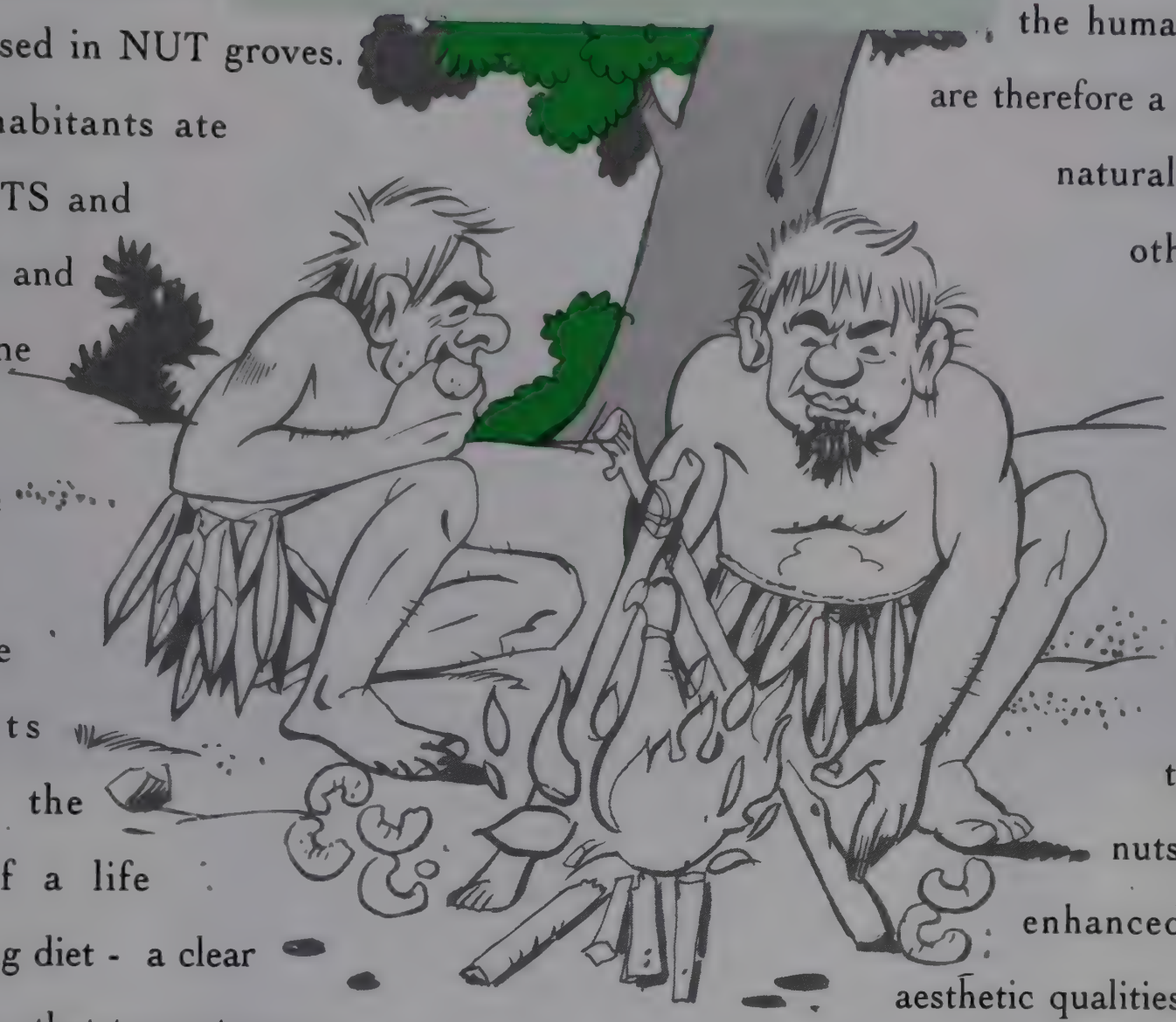
In a corelated research article, supplementing the Framingham study Roger Sherwin and Thomas Price of the University of Maryland supports researchers who advocate the Mediterranean diet. In such a diet, low levels of saturated fat might protect against heart disease, while higher levels of monounsaturated fat could prevent strokes. Needless to say it makes perfect sense that the healthy way to a man's heart is through a Mediterranean diet 1.

(Excerpt from the local Stock Journal, 27 December 97.)

NUTS

AN ANCIENT FOOD

One US archaeologist found evidence which suggests that over 10,000 years ago, the first permanent villages on the world possibly were based in NUT groves. The inhabitants ate the NUTS and legumes and raised the first domestic animals. These treenuts formed the basis of a life sustaining diet - a clear indication that treenuts are a fairly complete food. Nuts have evolved for centuries as festive, mysterious, symbolic, and supremely versatile. In prehistoric times nuts were a dietary staple, and they still are, in some places, but the changed value of human labour-to grow and market them takes a lot of work and has turned nuts into a "luxury food" in the western world.



Nuts loomed large in the diet of the anthropoid who preceded the human race and are therefore a particularly natural food. The other is that they are exceptionally nutritious. The mystique of nuts is greatly enhanced by their aesthetic qualities. Nuts are packaged by nature, often in an exquisite manner. ❑

The first humans to give up the hunter gatherer way of life settled down on the eastern Mediterranean coast to grow wheat and barley, then tamed sheep and goats for milk, most archaeologists believe. But excavations at a 10,000 year old village east of the modern city of Dizarbathi, Turkey, paint a different picture. Residents of sound stone houses there hunted wild sheep and goats, and ate NUTS and legumes.

National Geographic

SPICY CHICKEN WITH CASHEWNUTS

Chicken breast (boneless)	-	600 gm	Rice wine/dry sherry	-	20 ml
Cornflour	-	15 gm	Sugar	-	5 gm
Salt	-	10 gm	Ajinomoto	-	1 gm
Cashewnut, whole	-	200 gm	Sesame oil	-	1 tsp
Peanut oil	-	50 ml	Chicken stock	-	100 ml
Garlic, finely chopped	-	10 gm	Tomatto puree	-	50 ml
Ginger, finely chopped	-	10 gm	Red chilli paste	-	10 gm
Dark soya sauce	-	20 ml	Capsicum	-	150 gm
			Green gram, sprouted	-	30 gm

Method : 1. Cut the chicken into 1/2 inch cubes. Combine with 5gm salt and conflour, garlic, ginger, soya sauce, wine, sugar, chilli paste, ajinomoto in a small bowl and keep the mixture for 20 minutes. 2. Wash the cashewnuts in warm water. 3. Dissolve together tomato puree, salt and stock. 4. Heat oil in a wok or skillet. 5. When it is hot, add the chicken cubes, capsicum, cashewnuts and stir to keep them from sticking. 6. When the chicken turns white, in about 10 seconds, add the stock mixture and stir. When the cornflour is cooked, sprinkle with sesame oil. 7. Serve garnished with sprouted green gram, accompanied with cashew fried rice.

Portion size : 300gm chicken and 300 gm rice.

Portions : 4

DATE AND CASHEWNUT CAKE

Cashewnut, chopped	-	100 gm	Flour	-	75 gm
Dates, deseeded	-	100 gm	Baking powder	-	3 gm
Cherry, chopped	-	50 gm	Cashew cream	-	50 ml
Sugar, powdered	-	75 gm	Garam masala	-	2 gm
Butter	-	50 gm	Brandy	-	30 ml
Egg	-	2 nos	Caramel	-	10 ml

Method : 1. Sieve together flour, baking powder and garam masala. 2. Soak the cashew, dates and cherry in brandy and caramel and keep for 2 hours. 3. Mix the flour mixture with the cashew mixture. 4. Cream together sugar and butter until light. 5. Beat together egg and cashew cream. Then gradually add to the sugar mixture. 6. Fold in the flour mixture. Divide into 4 even sized portions and put in a greased jelly mould. 7. Bake at 190° C for 20-25 minutes. 8. Cool, unmould and serve sliced or whole.

Accompaniment : Vanilla sauce/brandy sauce/fruit compote.

Portion size : 120 gm.

Portions : 4

HAZARDS ANALYSIS CRITICAL CONTROL POINT SYSTEM - A NEW CONCEPT IN ASSURANCE OF FOOD SAFETY

Dr. Ramachandra Sharma*

Introduction

Food has been implicated as a vehicle for transmission of many ailments commonly referred to as food-borne diseases (FBDS). Many of these food borne diseases cause morbidity and occasionally, mortality. A proper recourse to good manufacturing practices coupled with good sanitary and hygiene practices during processing and preparation of food helps to bring down the food-borne hazards to a considerable extent. To gauge the degree of control exercised during the preparation and processing of foods, inspection can never be performed frequently or thoroughly enough to provide the degree of safety which is required or desired by the processors and consumers. Thus, finding that the examination of final products is not guaranteeing any reliable safety net against food borne diseases and not contributing to the improvement in the quality of foods, food microbiologists have created and developed a new approach namely Hazards Analysis Critical Control Points (HACCP) system as a valuable contribution to the Total Quality Management.

HACCP was originally conceived in USA in 1960 and jointly developed by NASA, the Natic Laboratories and Pilsbury Company to ensure safety of foods prepared for astronauts. The concept combined principles of food microbiology, quality control and risk assessment to obtain as nearly as possible a fail safe system. The concept of critical control point' (CCPs) was first described in detail in 1971 at the National (USA) Conference on Food Protection, when Baumam presented two background papers defining, systematizing and locating the CCPs. In 1974, USFDA applied this concept to the Low Acid Canned Foods. World organisations such as WHO, the International Commission on Microbiological Specification for Food, (ICMSF), FAO & the Codex Alimentarius Commission are all encouraging the use of HACCP. The British Government has also adopted HACCP, following recommendations made in the Richmond Report, Canada, and the European Union (EU) have started implementing HACCP.

Although initially HACCP originated as a tool focussing only on the microbiological risks to product safety, the concept has been widened to include such risks as foreign body contamination, agro chemical residues, heavy metal contaminants and also economic frauds. Besides, HACCP system is capable of addressing a much wider range of potential hazards. It is now considered as the most appropriate system for all types of food operations (viz growing and harvesting of crops, raising live stock and poultry, catching and holding fish, transporting, storing, processing, marketing and preparing food). These systems are usually implemented by industry and verified by food control agencies.

HACCP Principal Activities:-

HACCP system consists of the following seven principal activities.

Principal Activity I
: Conduct Hazard Analysis, identify hazards and specify control measures.

Principal Activity II
: Identify Critical Control Points (CCPs)

Principal Activity III
: Establish Critical Limits at each CCP

Principal Activity IV
: Establish monitoring procedures

Principal Activity V
: Establish corrective action procedures

Principal Activity VI
: Establish verification procedures

Principal Activity VII
: Establish appropriate documentation procedures

Before going into the details of system, let us familiarize with some of the terms commonly used.

*Technical Officer, **Export Inspection Agency** - Cochin, Cochin - 682 005

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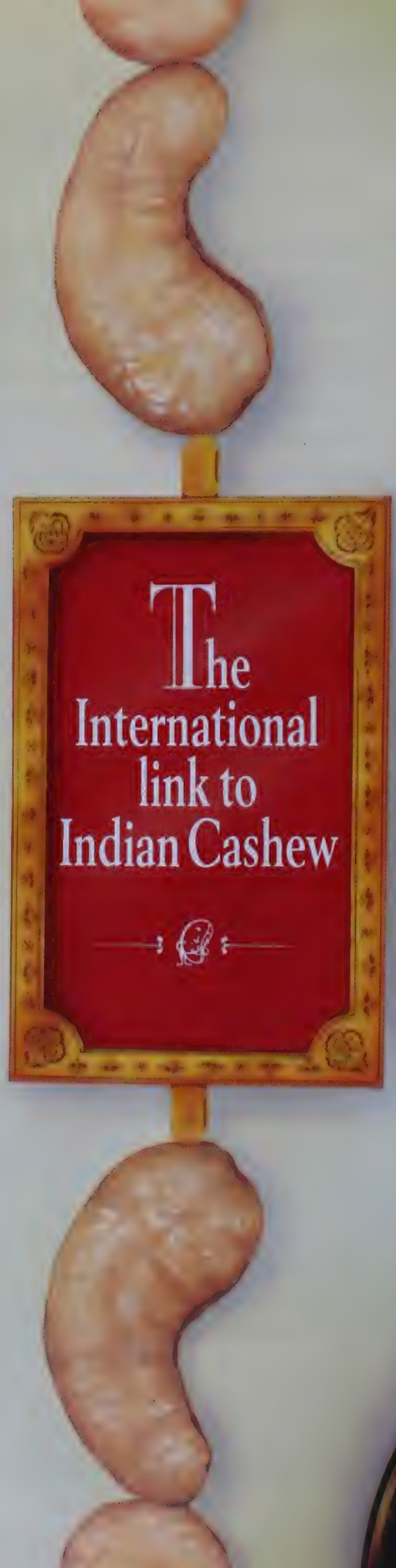

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Hazard: A biological, chemical or physical agent or condition with the potential to cause harm.

Risk: An estimate of the likely occurance of a hazard.

Severity: The seriousness of a hazard.

Hazard Analysis: The process of collecting and interpreting information to assess the risk and severity of potential hazards.

Critical Limits: A value which separates acceptability from unacceptability.

Critical Control Point: Is an operation (practice, procedure, process or location) at which a preventive or control measure can be exercised that will eliminate, prevent or minimize a hazard of several hazards to acceptable levels.

Monitor: To conduct a planned sequence of observations or measurements to assess whether a CCP is under control.

Corrective action: The actions taken when monitoring at a CCP indicates a potential loss of control or when a critical limit is not met.

HACCP plans: The written document based on the principle activities of HACCP, which describes the procedures to be followed to assure the control of a specific process or procedure.

Verification: The use of methods, procedures or tests in addition to those used in monitoring to determine whether the HACCP system is in compliance with the HACCP plan and or whether HACCP plan needs modification or revalidation.

Application of HACCP Principal Activities:

The concept of HACCP system can be applied to the entire food chain, where food is grown, harvested, slaughtered, processed, manufactured and prepared for final consumption, using different technologies. Thus applying the HACCP concept at the initial planning and development stage, the potential hazards can be 'designed out' of products and processes. During the implementation of HACCP, enough consideration should be given to the impact of each of the following on food safety. viz, raw materials, other ingredients, manufacturing practices, end uses of the product, consumer population at risk, epidemiological aspects.

HACCP intends to focus control on CCPs. Redesign of the process may be attempted, if a hazard is identified but no CCPs are found. The HACCP system should be subjected to review to incorporate any changes, when any modification is made in the product, processes or any step. Thus we can see that flexibility is a clearly stated facet of any good HACCP plan.

The logical sequence for application of HACCP is described below:

1. Assembly of team

Since a HACCP study requires the education, collation and evaluation of technical data, a multi disciplinary team is a basic requisite. The team approach is known to improve greatly the quality of decision taken. The team may preferably consist of a quality assurance/control specialist, a production specialist, an engineer and other relevant specialists like packaging expert or a hygiene manager. QA/QC specialist must be able to understand the microbiological and or chemical hazards and associated risks for a particular product group. The Production Specialist should have a thorough knowledge of the processes taking place. The Engineer must have a working knowledge of the hygienic design and engineering operational aspects of the process equipment involved. The services of packaging specialist, hygiene expert or even a buyer can be called for as appropriate. The number of persons on the team will vary depending upon the food and type of operations under consideration, nature of hazards and sophistication of control measures involved. In smaller organizations, single person (eg : Quality Assurance Manager) may have to perform many roles eg : roles of production specialist, packaging expert or hygiene expert. External expert advice can be sought, if needed.

2. Description of the product

A detailed description of the product under study or intermediate product, if only part of the product is being looked at, should be clearly defined in terms of composition, structure, processing (eg : heating, freezing drying, salting, smoking and to what extent); packaging system (vacuum, MAP, hermetic etc.), storage and distribution conditions, required shelf-life and finally instructions for use.

3. Identification of the intended use

The intended use of the product by

the consumer and consumer target groups should be defined. The intended use should be based on the anticipated uses of the product by the consumer. The products to be used by vulnerable groups of the population such as infants, children, pregnant women, invalid and the elderly have to be given special consideration.

4. Preparation of a flow diagram and facility layout

The HACCP plan centers around the flow diagram. Thus the first thing is to study the process/product under consideration and construct a flow diagram. There are no hard and fast rules for the preparation of a flow diagram. It is a matter of choice. However each step in the process (including process delays) should be outlined in a sequence from the selection of raw materials through to processing, distribution, retail and consumer handling, with sufficient technical data, for the study to proceed. A diagram of the layout of the facility indicating equipments and movements of products and personnel through the process should also be prepared.

Some of the technical data required are given below:

a) Data on all raw materials/ ingredients and packaging used (microbiological, chemical, physical data).

b) Sequence of all process steps (including raw materials addition).

c) Time/Temperature history of all raw materials, intermediates and final products, including potential for delay.

d) Flow conditions for liquid and solids.

e) Product recycle/reworkloops.

f) Equipment design features including presence of void spaces.

g) Efficiency of cleaning and dis-infection procedures.

h) Environmental hygiene.

i) Personnel routes.

j) Routes of potential cross-contamination.

k) High/Low risk (hot/cold) area segregation.

l) Personal hygiene practices.

m) Storage and distribution conditions.

n) Consumer use instructions.

5. On-site verification of flow diagram

The primary task of the HACCP team is to confirm the processing operations against the flow diagram during all stages and hours of operation and amend the flow diagram and facility layout where appropriate.

6. Listing all hazards associated with each step and considering preventive measures to control hazards

(Principal Activity I)

Using the flow diagram the HACCP team should identify all the biological, chemical and / or physical hazards that may be reasonably expected to occur at each step, including acquisition and storage of ingredients. The team also should describe the preventive measures that can be used to control, eliminate or minimise the hazards. The team next analyses each hazard.

Only those hazards, whose elimination or reduction to acceptable level is essential to the production of a safe food, are being considered here. A hazard is unequivocally defined as the unacceptable contamination of a biological, chemical or physical agent/nature and or survival or multiplication of pathogenic microorganisms and / or unacceptable production or persistence of toxin or other microbial metabolites. Pathogenic microbes (bacteria and viruses), parasites, toxic plants and animals constitute biological hazards. The class of chemical hazards covers mainly pesticides, antibiotics, heavy metals, cleansing agents and additives (eg : sulfites). Physical hazards include physical contaminants (eg : broken glass, metal pieces, staples, bone fragments, shells, stones) that may cause injury in the mouth and other parts, break teeth cause choking or perforate the alimentary tract.

Control measures are those actions that can be used to eliminate, prevent hazards, reduce their impact and occurrence to acceptable levels. CCPs are not established at this step.

7. Establishment of Critical Control Points

(Principal Activity II)

The use of the concept of decision tree (diagram 1) helps in determining whether a step is a CCP for the identified hazard. All probable hazards at each step should be considered. Each step in the flow chart must be considered in

sequence, using the decision tree.

If a hazard has been identified at a step, where control is necessary for food safety and no preventive measure exists, at that step or any other steps then the product or process should be modified at that step or any earlier or later stage to include a preventive measure. Application of the decision, tree very easily determines whether the step is a CCP or not for the hazard.

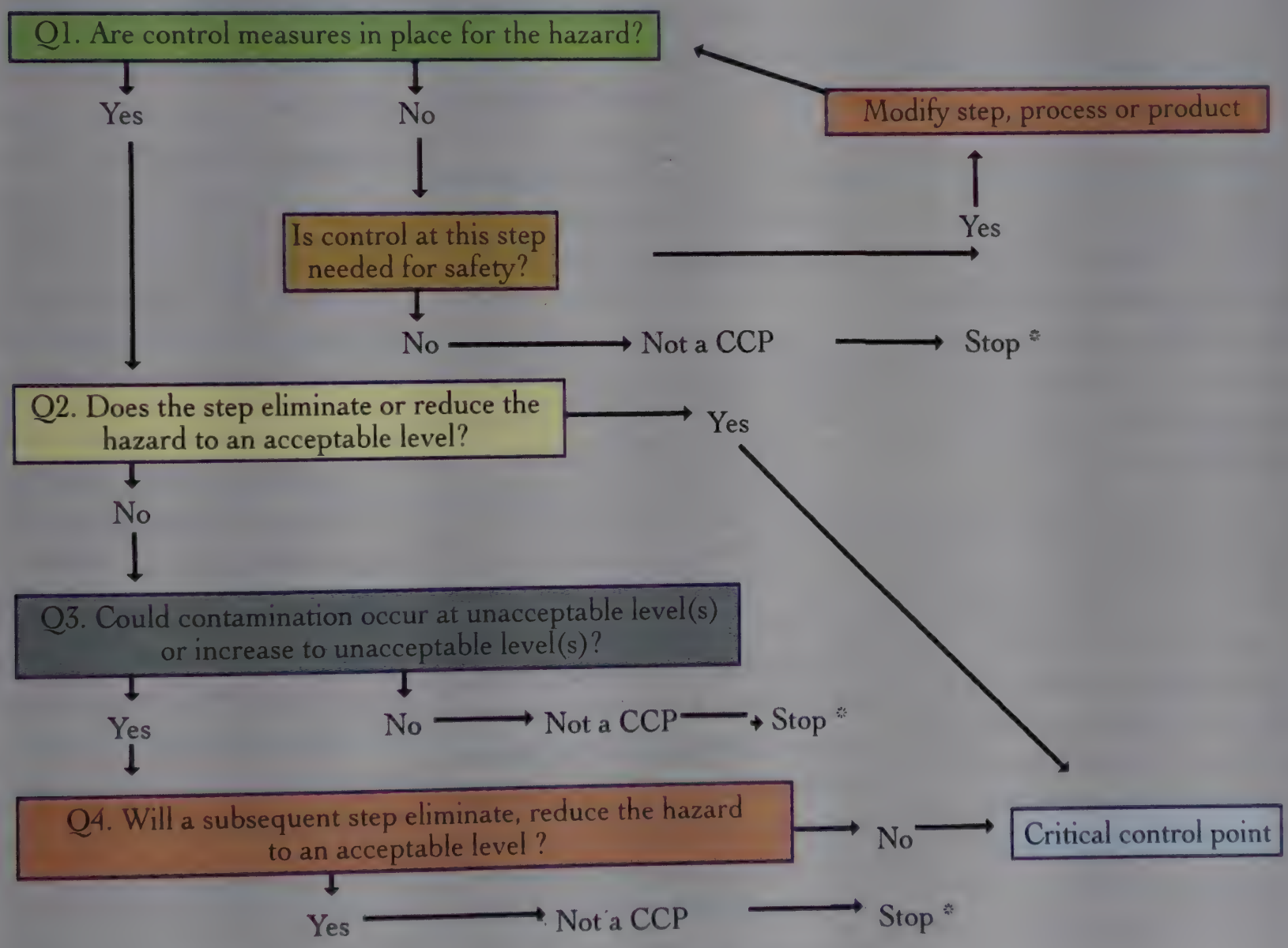
Depending upon the nature of control exerted (elimination, prevention, reduction) there exist different types of critical control points. They will either eliminate, prevent or minimise the hazard. Critical control points are sometimes referred to as a CCP_1 where hazards are eliminated or prevented and a CCP_2 where hazards are only minimised, reduced or delayed. It does not mean that a CCP_2 is less important than a CCP_1 Critical Control points can be clearly classified as CCPe. CCPp and CCPr CCPe is an operation at which hazards are eliminated and no further problems exists from this point of processing. Be careful, hazards however may be introduced at later stages of processing. eg:- Retorting and pasteurisation.

CCPp is an operation at which hazards are prevented, but not necessarily eliminated. Eg: growth of bacterial pathogen is prevented by freezing but the organism is not killed (eliminated). During thawing, the hazard surfaces and may even increase, if the thawed product is held at temperatures suitable for bacterial growth.

CCPr is an operation at which hazards are significantly reduced,

CCP DECISION TREE

Answer each question in sequence at each step for each identified hazard



* **Proceed to the next step/identified hazard in the described process**

Diagram 1

minimised or delayed but they are not eliminated or even prevented. Some simple common place examples are the using of sanitised vessels in handling foods, rather than using hands and refrigerating perishable foods.

Thus control of hazards at a CCP ranges from absolute to partial. The HACCP team should be able to distinguish a CCP from ordinary control activities or control points. An ordinary control point is an operation at which preventive and or control actions are taken because of good manufacturing practices, regulations, company policies or aesthetics. This distinction between control points and critical control points is one of the unique aspects of HACCP concept.

8. Establishment of critical limits at each CCP

(Principal Activity III)

Critical limits must be specified for each control/preventive measure at each CCP. In actual practice, it is seen that more than one critical limit is usually found at a particular CCP.

In some cases the concept of target levels are used to ensure that critical limits are met. The target level is the pre-determined value for the control measure applied at each CCP with the tolerance indicating the degree of latitude allowable. The target levels are somewhat stringent than critical limits. These are specifically used by a processor to reduce the risk of exceeding a critical limit.

Critical limits are commonly related to temperature, time, moisture level, pH, aw, available chlorine, sensory parameters such as visual appearance and texture.

9. Establish a monitoring system at each CCP

(Principal Activity - IV)

Utmost care should be exercised in selecting the proper monitoring system as this forms a key element in any HACCP study. Monitoring is the planned scheme of measurement or observation made at a CCP to determine compliance with critical limits or target level. The monitoring procedure must be able to detect loss of control at the CCP. More important, the monitoring should provide this information in time for corrective action to be taken to maintain control of the process before there is a need to reject the product. If monitoring is not continuous it should be ensured that the frequency of monitoring is sufficient enough to guarantee that the CCP is under control. Data received from monitoring must be evaluated by a designated person with knowledge and authority to carry out corrective actions when they so indicate.

Monitoring procedures for CCPs must preferably be rapid methods rather than lengthy analytical testings. Online measurements are preferred to offline measurements. Physical and chemical measurements are preferred to slower: microbiological testing. Certain physical and chemical parameters can also indicate the microbiological control on the product.

10. Establishment of corrective action plan

(Principal Activity V)

The HACCP team should prepare an action plan which clearly specifies the type of action to be taken when monitoring shows that a CCP has deviated from its critical limits or when the results indicate a trend towards loss of control. In the second case, the process must be adjusted to gain control over the situation, before it deteriorates to loss of control and hence to a safety hazard. In the former case, also, the process has to be brought back to control and the food produced during the deviation period is to be disposed as recommended in the disposition procedure. Both corrective actions and disposition actions have to be documented in the HACCP - recorded keeping.

11. Establishment of Verification Procedure

(Principal Activity VI)

Proper procedures for the verification must be established to ensure that the HACCP system is working correctly. Verification should mainly cover the following two points.

a) Is the HACCP system originally implemented still adequate to take care of product/process hazard?

b) Are the established monitoring procedures and corrective actions still being correctly followed?

The HACCP team should identify the methods and frequency of verification procedure. The frequency of verification should be sufficient enough to assure that the HACCP plan and its application can prevent safety hazards. Examples of verification activities include

a) Review of HACCP system & its records

b) Audits to observe if CCPs are under control

c) Review of corrective actions, deviations and product disposition actions.

d) Validation of established critical limits

e) Review of the existing/anticipated end use of the product.

12. Establishment of record-keeping and documentation

(Principal Activity VII)

Efficient, adequate and accurate record-keeping is essential to the successful application of HACCP system. It is the primary duty of a processor to maintain records. The procedures at all steps of HACCP should be documented and assembled in a manual. Some of the examples of records are:

HACCP plan, monitoring, deviation file, corrective/disposition action file, cleaning, disinfection records, modification file, verification data and review data.

Benefits

Some of the benefits derived from the application of HACCP are given below:-

1. HACCP is a systematic approach covering all aspect, of food safety at all stages of food chain right from growth, harvest, raw materials, purchase, production, distribution, storage to final use.
2. HACCP pushes a processor from the retrospective end product testing approach towards a preventive quality assurance approach.
3. HACCP provides for a cost-effective control of food borne hazards.
4. A properly applied HACCP system should identify all the present hazards and also those which can be predicted.
5. HACCP helps to concentrate technical resources into critical parts of the processes.
6. HACCP reduces product losses.
7. HACCP is complementary to other quality management systems such as ISO-9000 series.
8. International agencies such as the Joint FAO/WHO Codex Alimentarius Commission approves HACCP as the most effective means for controlling FBDs.
9. HACCP encourages confidence in the safety of food products and thus promotes confidence in food trade.
10. HACCP system can facilitate design and construction of new food processing facilities and equipment by predicting potential hazards and suggesting control measures.

Conclusion

The implementation of HACCP system primarily rests with the management. It focuses on prevention of hazards rather than on cure and hence provides scope for continuous improvement. It provides the opportunity for involvement of employees at all levels. It raises the awareness of each employee to hazards and its prevention. Since HACCP system is flexible and adaptable, an integrated approach to Quality Management involving the elements of ISO 14000 (BS-7750) on Environmental Management System (EMS) HACCP may be visualised as the ideal quality management system for any progressive Food Manufacturing Company entering the 21st century. The adoption of this integrated approach will enable the company to perform without harm-"Primum-non-nocere"-which, according to Peter Drucker, the great Management expert, should be the motto of any progressive company.

References

1. Campden Food & Drink Research Association HACCP - A Practical Guide-Technical Manual No. 38 (1992)
2. WHO (1993) Guidelines for the Application of the Hazard Analysis Critical Control Point (HACCP) System. Codex Alimentarius Commission, FAO, Rome.
3. G. Moy et.al (1994) Application of HACCP to food manufacturing: Some considerations on harmonization through training. Food Control (1994) Vol. 5 No. 3 131-139.
4. F. L. Bryan et.al Procedures to implement HACCP-International Association of Milk, Food and Environmental Sanitarians, Inc, Ames, lowa, USA 1991.
5. J. J. Dick (1993) ISO 9000 & HACCP. A Definite Role in the Indian Food Industry-Indian Food Industry (1993) 12(6)-16.

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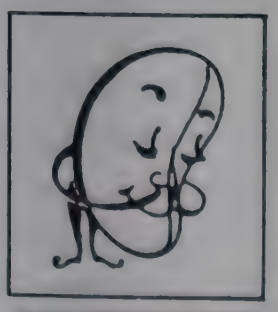

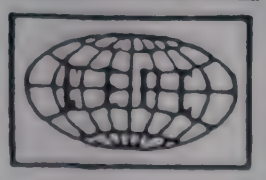

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India - the cashew country.

Kerala is a remarkably beautiful state in India, the cashew country. According to the most popular of legends, Kerala owes her origin to Parasurama. Parasurama an avatar of Lord Vishnu, is said to have flung his battle axe across the tumultuous sea. The water receded and Kerala came into existence. True to the legend, Kerala's history, from the olden times to the present, is interwoven with the sea.

Rich with tradition, culture and splendour, Kerala is a veritable treasure-trove for the holidayer. The enchanting beauty of the land has earned her the name 'God's own country'. The entire scene is picturesque with exciting backwaters, sunkissed beaches, luxuriant palm groves, lush green carpets of paddy fields, exquisite flora and fauna, and criss-crossing lakes, lagoons and canals. No doubt, discovering the true Kerala is an experience to treasure ... which leads to certain enchantment.

CLIMATE

Inspite of being situated in the tropical belt, Kerala enjoys a salubrious climate. March to May are the summer months, while December to February enjoys a short spell of pleasant winter. Kerala gets her annual rainfall in the six months from June to November. The south-west monsoon brings most of the rainfall between June and August, followed by a comparatively weaker north-east monsoon. The entire power generation and, to a great extent agriculture, depend on these monsoons.

TRADE

Long before the 3rd century BC, Egyptians, Phoenicians, Chinese and Babylonians had trade relations with Kerala. In search of spices, sandalwood and ivory, Vasco da Gama reached the shores of Kerala at Calicut in 1498 AD. King Solomon's ships are said to have called on her shore in 1000 BC. The Arabs and Chinese also made their mark on Kerala, and fishermen even today use Chinese fishing nets.

Muziris, presently known as Kodungalloor, was the most important port in ancient India. Greeks, Phoenicians, Romans, Persians, Chinese and Arabs were regular participants in what was a flourishing trade. Copper, brass, tin, lead, chrysolite and mica were brought in by the merchant mariners and in turn, they took back exotic spices such as pepper, ginger, clove and cinnamon.

FESTIVALS

Onam is the most important and popular of all Kerala festivals and is celebrated as the reminiscence of a bygone golden era. As a gesture of

welcoming the legendary King Mahabali (who is believed to visit the state on that day to enquire the welfare of his subjects), myriad floral patterns are decorated everywhere. The most exciting feature of the festival, however, is the snake boat races held at several places in palm fringed lagoons. Various kinds of boats - beak-shaped, kite-tailed and curly-headed take part in these thrilling contests. The 'Trichur Pooram' is another occasion of importance, which is the most significant among a series of temple festivals so common in the state. It is celebrated in Trichur in the Thekkinkadu Maidan outside the Vaddakkunatha Temple. Caparisoned elephants are lined up in a most memorable piece of pageantry, which is followed by a breathtaking display of fire works !

PEOPLE

For the holiday-maker, Kerala is a land of sunshine and warmth- an enchanting land made more alluring with her warm hearted people. The people of Kerala are warmly hospitable and are considered to be highly intelligent and industrious and are the main stay of many booming economies such as the Middle East.

The population of Kerala is a combination of Negritoes, Proto Australoids, Dravidians and Aryans. The fusion of diverse cultures has made the people modernistic in outlook, and this is all the more evident in the major cities of Trivandrum, Cochin and Calicut.

AGRICULTURE AND INDUSTRY

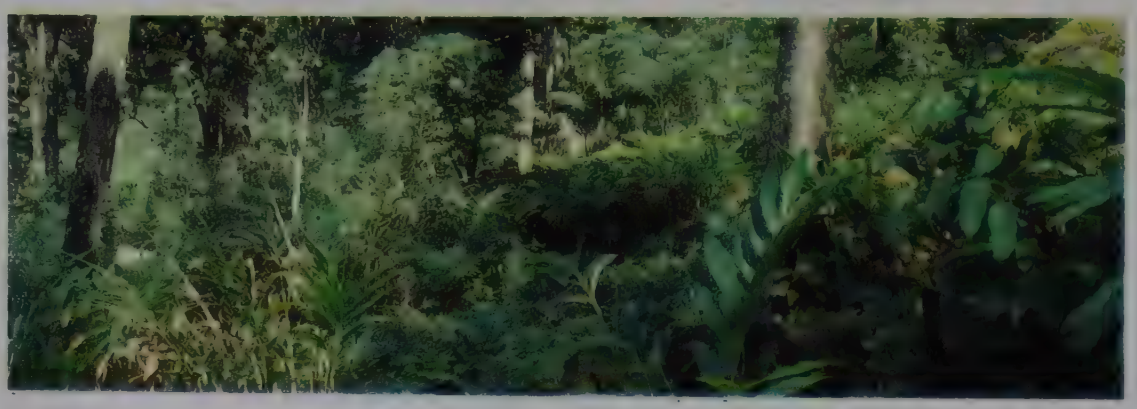
Kerala is endowed with a rich variety of flora and fauna. The economy is predominantly agrarian, divided between food crops such as paddy and tubers and more significant cash crops like cashew, coconut, arecanut, coffee, tea, cocoa, pepper, cardamom, ginger, chilli, cinnamon, lemon grass and rubber. A large variety of flowering and fruit bearing vegetation including hibiscus, cassia, jackfruit, mango, pineapple and banana exist all through the state. The forests in Kerala are rich in teak, mahogany, rosewood, sandal, eucalyptus and bamboo. These serve the newspaper and rayon industries in the state. The cash crops and the abundant marine wealth form the backbone of Kerala's economy.

CULTURE

Kerala has an enviable cultural milieu. Which is marked by the sheer breathtaking variety, quite hard to come by anywhere else. The talents of a lot many great personalities have gone into the making of the land's culture. One such personality is Adi Sankara.The greatest contribution to the world of metaphysical thinking was given by him. He is believed to have lived between 788 AD and 820 AD. Sankaracharya as he is revered today, is remembered as the greatest of all Indian thinkers. Aryabhatta, the great ancient astronomer, is believed to have been born in Kerala. Ayurveda, the ancient Indian science of life and medicine, also took deep roots on the land and is even today the accepted method for treating diseases.

True to its rich cultural tradition and heritage, Kerala has an inexhaustible collection of evocative art forms and dances. *Kathakali* is a mime drama that was formed from a temple art form. *Theyyam* is extravagantly colourful and evocative. *Ottan thullal* is characterised by its stinging satire. Thiruvathirakali and Sanghamkali involve appealing team work.

QUILON



Quilon, popularly called Kollam, is fairly important for the state's trade and commerce. It is the centre of the country's **Cashew Trading and Processing industry.** It is also an important hub for the state's marine products industry, with the port-of Neendakara being the centre for trawlers and ice plants.As a typical southern Kerala town, Quilon offers a tranquil, rural atmosphere, punctuated by the bustle of trade and commerce in its many busy and crowded streets and junctions. On the outskirts of the town are Cashewnut processing factories.The Cashew Export Promotion Council has recently set up a Quality Upgradation Laboratory & Technical Consultancy Division in Quilon. The services of this Laboratory will not only be available to the Cashew industry, but also to the entire food processing industry in India.

PLACES TO SEE

Adventure Park

Located next to the Government Guest House at Asramam, 3km away from the central bus stand, is an Adventure Park which delights children.

Palaruvi

Five km from Ariankavu is the waterfall at Palaruvi at a height of 300 feet.

Sasthamkotta

Sasthamkotta is Kerala's largest freshwater lake, situated 29km from Quilon, on the right bank of the Kallada River. This is a small town with a temple dedicated to Lord Sastha.

Thangassery

Its historical importance becomes evident by the ruins of the Portuguese/Dutch fort and as well as the 18th Century Church. The 3km long beach has a light house, which is open to visitors between 3.30pm and 5.30p.m.

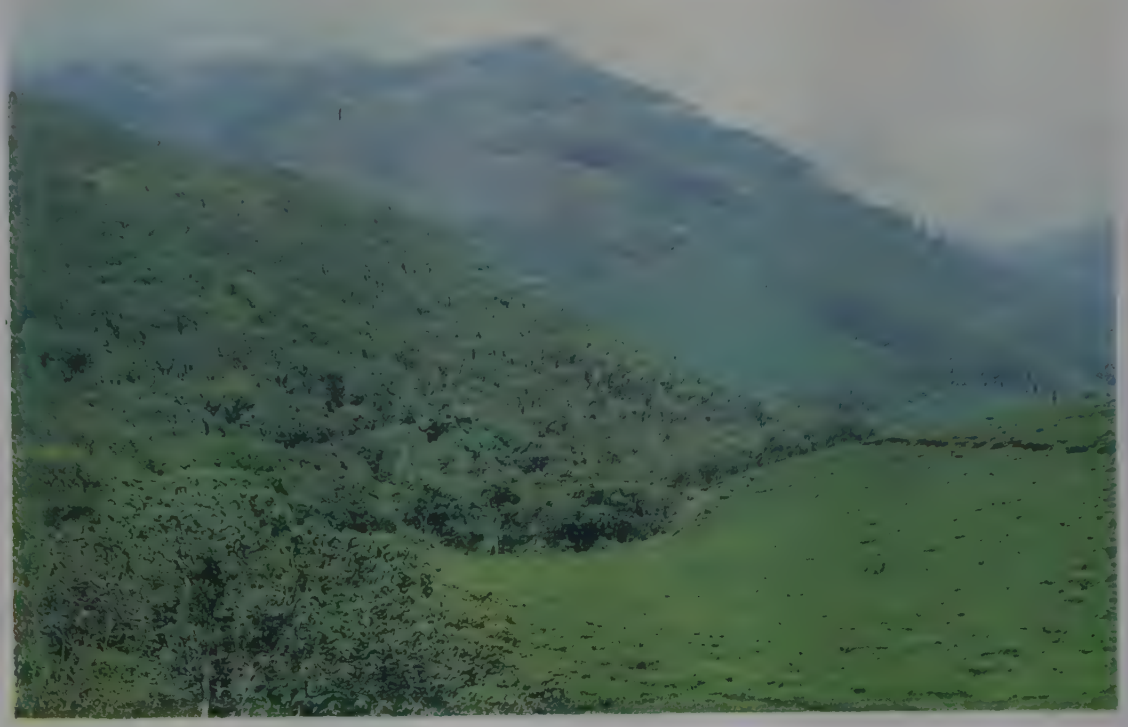
Thirumullavaram

Just 6 km north of the town centre and easily accessible by bus, is a beautiful and quiet little beach, ideal for swimming or sun-bathing

ALLEPPEY

For tourists, Alleppey is the pivotal point for trips into Kerala's famed backwaters and the state's lush rice bowl. Its alluring beauty has earned it the name 'the Venice of the East'. The town is designed with two canals running parallel to each other through the heart of the town linking it with the backwaters.

Alapuzha (the vernacular name for Alleppey) enjoys a unique place in the maritime history of Kerala. It is the world's major supplier of coir yarn and coir mattings. The climate which is moist and hot near the coast, is relatively cooler and drier inthe interior. The Nehru Trophy Boat Races, conducted here, are considered to be the most interesting water regatta in the country.



PLACES TO SEE

Pathiramanal

A beautiful island, where hundreds of rare birds migrate from different parts of the world. The island is accessible only by boat.

Krishnapuram Palace

A museum with antique sculpture, paintings and bronzes is housed inside the palace. The famous *Gajendramokshom* mural is on the ground floor of the palace.

Mannarasala

32 km from Alleppey, is a very important centre of serpent worship in Kerala. Built in a cool grove of trees and shrubs, this temple is said to contain 30,000 images of snake-gods, which line the path to the temple.

CALICUT

Calicut was also Vasco da Gama's first stop in India. He set foot on the sands of Kappad beach. Calicut has also lent its name to 'Calico', the fine variety of handwoven cotton cloth which is said to have originated in this place. Today, Calicut is an important trading centre for timber and tiles and the shopping ground for the famous delicacy among sweets - the Calicut halwa.

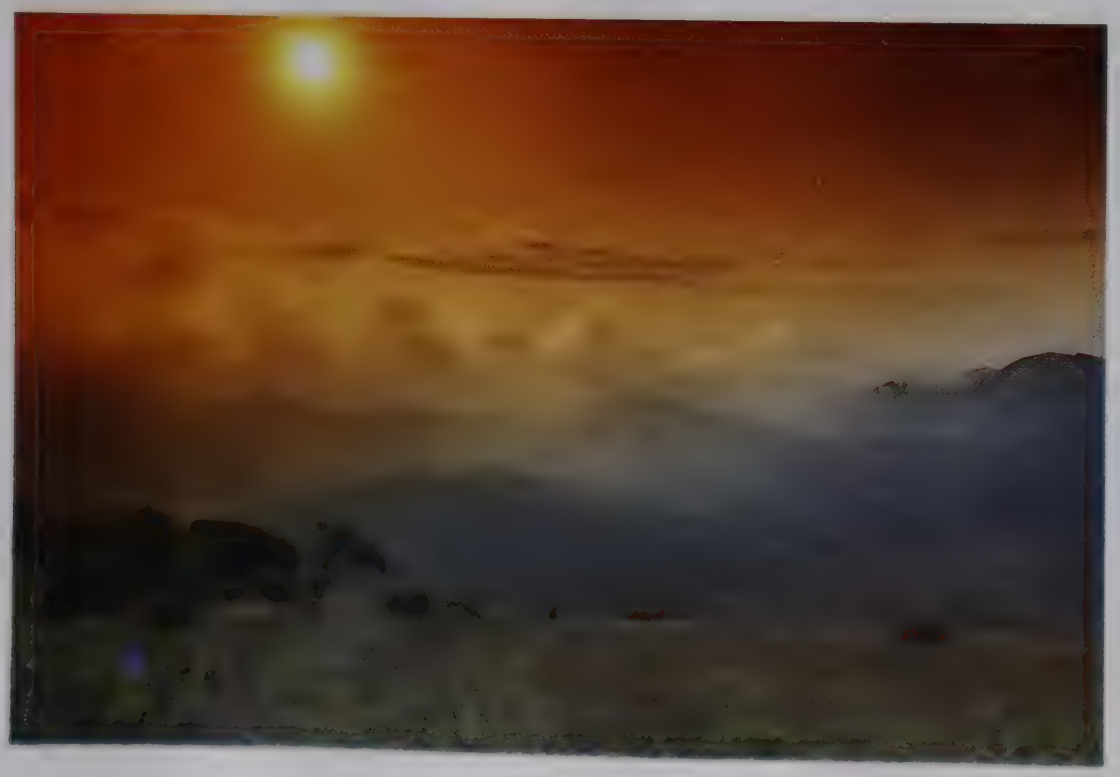
PLACES TO SEE

Dolphins Point

Just 15 minutes' drive from the city centre, you can see dolphins playing in the sea in the early hours of the morning. The beach, 2 km from the town, is a long stretch of tree-lined sand with the Lions Club park, the light house and the two piers. It is an excellent place to relax.

Pazhassirajah Museum and Art Gallery

The Museum displays ancient mural paintings, antique bronzes and old coins as well as models of temples, megalithic monuments like umbrella stones. The Art Gallery contains the collections of Raja Ravi Varma and Raja Raja Varma, famous painters of Kerala..



Tellicherry and Sultan Battery

Both are important trade centres of Calicut. The Calicut - Sultan Battery roadoffers a breath takingly scenic drive.

CANNANORE

Known as Kannur in Malayalam, Cannanore's history abounds with the activities of colonial powers. Some of Kerala's finest weavers come from this district. Marco Polo is said to have referred to Cannanore as a great emporia of spices. For many centuries, this sea coast town in the northern Malabar area was the capital of the Kolathiri Rajas, the rivals of the Zamorin dynasty of Calicut. Today Cannanore is known for its handloom and beedi industries.

Places to see

St. Angelo's Fort

It is a huge triangular structure built with laterite with a ditch and strong, flanking bastions. During their colonial rule, the British captured it from Ali Raja of Cannanore and made it the most important military base for their soldiers.

Ezhimala

Known for rare medicinal herbs used in Ayurvedic formulations, it is an isolated, but conspicuous cluster of hills. At the foot of the hills is a cave and an old burial chamber. Further up the hills is an ancient mosque, where sculpted stone pillars are found.

Mahe

It is a small and beautiful town on the west coast, established by the French in the 17th century.

Parassinikadavu

Here is a famous temple dedicated to Lord Muthappan. It is the only temple where *Theyyam*, the ritual dance form, is performed daily.

COCHIN

The commercial capital of Kerala, Cochin is popularly known as the 'Queen of the Arabian Sea' It is the most cosmopolitan of the cities of the state. Centuries ago, traders and seafarers called at Cochin to trade in pepper, seafood, rubber and coir. Most of the city's commercial centres and shops are located in the town called Ernakulam, which also lends its

name to the district. The Cashew Export Promotion Council is located at Chittoor Road in Ernakulam.

Places to see

St. Francis Church

It is said to be the oldest European Church built in India and is also the original burial site for Vasco Da Gama, who died in 1524.

Dutch Palace

Originally built by the Portuguese, it was presented to the Raja of Cochin in 1555. Taken over later on by the Dutch, it soon came to be called the Dutch Palace. On display here are dresses, turbans,palanquins and weapons from that era.

Jewish Synagogue

Located at Mattancherry, built in 1568 AD, it contains a Belgian chandelier, the great scrolls of the Old Testament and the copper plates, on which the grants of privilege made by the Cochin rulers to the Jewish community.are recorded.

Bolghatty Island

It is the site of the Bolghatty Palace built by the Dutch in 1744. The grounds have a small golf course and several vantage points for lovely views of the harbour and the sea.

IDUKKI

The name Idukki is supposed to be derived from the Malayalam word *idukku* which means a narrow gorge. The river Pamba originates in the mountains of Idukki. Thick forests, streams, valleys and hills combine to make Idukki an ideal year-round tourist destination. 60 percent of Kerala's power needs are met by the hydroelectric power station at Moolamattom. The famous Idukki dam is built between two huge granite-hills across the river Periyar.

Places to see

Periyar Wildlife Sanctuary at Thekkady

This Sanctuary is located around an artificial lake formed by a dam across the Periyar River. The Sanctuary's rain drenched tropical forest is the natural habitat of elephants, bisons, spotted and sambar deer and the wild boar. Birds like the Malabar grey hornbill, the grey jungle fowl and the jungle myna can also be spotted.

Peermade

Formerly the summer retreat of the Travancore Rajas, this tiny and cool hill station is full of rubber, tea, coffee, pepper and cardamom plantations, interspersed with waterfalls and grasslands.

Munnar

Munnar boasts of having the highest peak in South India - Anamudi which is 2695 metres high. It is a beautifully peaceful hillstation, draped by the rolling expanse of tea plantations.

KASARAGOD

Kasaragod is known for its coir and handloom industries. Fishing is a prime source of livelihood. The district has ample natural resources like water, forests and mineral deposits. Barren rocks seen amidst dense vegetation and calm lagoons visible through the coconut palms along the coastal belt lend this district a rare and distinct beauty.

Places to see

Bekal

A cute village in north Kerala, it is blessed with a fascinating mix of natural attractions: sprawling beaches of golden sand, placid backwaters, lush greenery and the calm expanse of the Arabian Sea. Bekal's magnificient fort is steeped in history,and belonged in ancient times to the Kadempa dynasty. It later came under the Kolathiri Rajas. In the late 18th century Tipu Sultan captured it. After he was ovethrown by the British, the fort came under the East India Company.

Chandragiri

This fort was built in the 17th century by Sivappa Nayaka of Bedanore. There is a mosque nearby and also an ancient temple.

KOTTAYAM

It is the first town in India to attain total literacy. It is also the mecca of Kerala's publishing industry, being home to dozens of Malayalam newpapers and magazines.

Kottayam is also an important commercial centre. Most of India's natural rubber originates from the acres of well-kept plantations of

Kottayam, also home to the Rubber Board, one of the country's primary commodity boards.

Places to see

Kumarakom

A small village 12 km west of Kottayam town, Kumarakom is situated on the banks of the Vembanad Lake, Kumarakom is a bird sanctuary known for local varieties like water fowl, cuckoo, owl and water duck.

Ayyampara

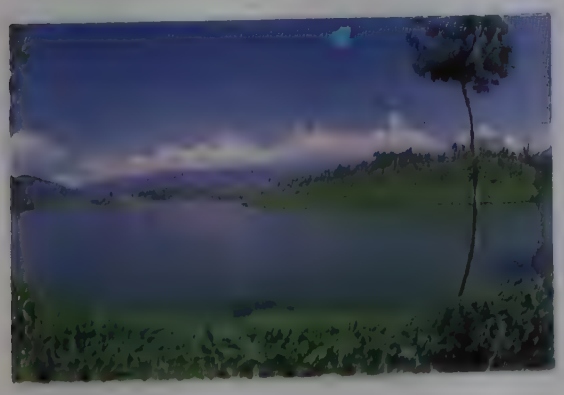
43 km from Kottayam, it is a little known scenic spot of rocky plains where a 100 acre area of flat rock makes a natural granite stadium to enjoy the sunset and the town below.

Bharananganam

An important christian pilgrimage centre, where the mortal remains of sister Alphonsa is interned. This 1000 year old church features an attractive statue of Virgin Mary.

MALAPPURAM

The father of Malayalam literature, Thunchath Ezhuthachan, the classical epic poet, was born in Thrikandiyoor in this district. The name Malappuram which literally means a terraced place atop hills, is



carved out of the districts of Calicut and Palghat

Places to see

Kottackal

Situated 12 km southwest of Malappuram and 168 km from Cochin, it is the home of the famed Kottakkal Arya Vaidyasala, pioneering centre for Ayurveda, Kerala's traditional system of health and medicine. Among the best known Ayurvedic centres in the state, this institution runs an Ayurvedic research centre, a nursing home and a hospital.

Jama-at Mosque

It is an important pilgrimage centre for the Muslims of Kerala. Adjoining the Mosque is a mausoleum of the Malappuram shaheeds whose brave exploits have been immortalised in Mappila war ballads.

Angadippuram

It is an important centre for both Muslims and Hindus,. It has the Tirumandhankunnu Temple dedicated to Goddess Durga as well as the Puthanangadi Mosque which has Arabic inscriptions engraved on one of the planks.

PALGHAT

Kerala's largest river, Bharathapuzha, flows through the district. It is supposed to have derived its name from the pala tree and kadu (forest). The whole area is said to have been once covered by pala trees.

Places to see

Malampuzha

It is the site of a large irrigation dam built across the Bharathapuzha. Around the large reservoir are beautiful landscaped rose gardens and amusement parks for children. The place has facilities for boat cruises in the reservoir. It also had a passenger ropeway to view the scenic heights.

Parambikulam Wildlife Sanctuary

It has a rich diversity of flora and fauna, besides a large variety of gaur, sambar and spotted deer, Nilgiri langur, jungle cat, lion-tailed Macaque, sloth bear, and otter along with tigers and leopards.

Silent Valley National Park

It contains India's last substantial stretch of tropical evergreen rain forests. Among the animals found here are the lion-tailed Macaque, elephants, tigers, wildboars, flying squirrels and wild dogs.

PATHANAMTHITTA

The river Pamba flows through this district, which is bounded on the east by the Western Ghats. Carved out of Quilon district, more than half of the area of Pathanamthitta district is forestland. Sabarimala, the best known pilgrimage destination in Kerala, .is in Pathanamthitta.

Places to see

Aranmula

This small town on the banks of the river Pamba, is situated 10 km from Chengannur on the Trivandrum-Kottayam route.It is famed for its expensive, polished metal hand-made mirrors called *Aranmula Kannadi* or Mirror of Aranmula. During Onam, the Aranmula Boat Race takes place amidst celebrations and festivals.

Mannadi

The valiant chieftain of Travancore, Velu Thampi Dalawa, spent his last days at Mannadi. The ancient Bhagwati temple here also houses the Kerala Institute of Folklore and Folk Arts, which has a museum of tapes and a library.

Perunthenaruvi Waterfalls

A breathtaking waterfalls, which flows down a rocky path into a 100 feet deep ravine.

TRICHUR

The name Trichur, often called the cultural capital of Kerala, derives from 'Tiru-Shiva Perur' or the land with the name of Lord Siva. The Kerala Kalamandalam, the Kerala Sahitya Academy and the Kerala Sangeetha Nataka Academy are all situated in and around Trichur. These centres have lent this town the status of Kerala's cultural capital.

Places to see

Vadakkunathan Temple

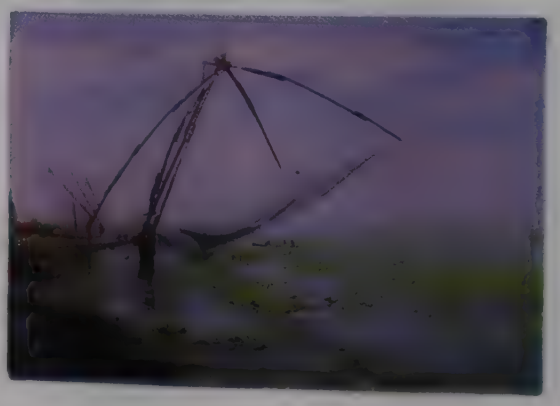
It is well known for its murals depicting the Mahabharatha as well as exquisite paintings and carvings. Trichur's most spectacular festival is Pooram, celebrated every year during April-May.

Cheruthuruthy

It is the home of the renowned Kerala Kalamandalam, founded by the poet Vallathol. It is in this academy that the best of Kerala's Kathakali Performers get their rigorous training.

Peechi Dam

It is an irrigation dam 23 km from Trichur. It offers boating facilities at the reservoirs. At Peechi-Vazhani Wildlife Sanctuary you might even spot a wild tusker or two.



TRIVANDRUM

Trivandrum is the capital of Kerala. Popularly known as Thiruvananthapuram' - which means the land of Anantha, the thousand- headed sacred serpent , who forms the couch on which reclines Lord Vishnu.

Places to see

Sri Padmanabhaswamy Temple

It is the city's best-known temple and a famous landmark, dedicated to Lord Padmanabha (Lord Vishnu). According to legends, the temple was built in stages to house an idol discovered in a forest by a devotee.

Government Art Museum

It forms part of a complex which also houses the Sri Chitra Art Gallery and the Zoological Gardens. The Art Gallery houses a rich collection of paintings by Raja Ravi Varma. The other antiques include bronze statues, treasures, costumes, masks, ancient jewellery, etc.

Veli

It is a well developed tourist spot. Its gardens have been landscaped by Kerala's famous sculptor, Kanai Kunjiraman, whose exuberant sculptures dot the greenery.

Kovalam

This world renowned beach with a sheltered bay is considered quite safe for swimming.

WYNAD

Wynad, with its peculiar geographical position, is blessed with mist-clad mountains and sylvan valleys. In the ancient days Wynad was ruled by the Rajas of the Veda tribe and later successively came under the control of the Pazhasi Rajas of the Kottayam dynasty, Tippu Sultan of Mysore and the British. Wynad claims to have the highest concentration of tribals in Kerala.

Places to see

Mananthavady

Mananthavady is situated on the Western Ghats of Kerala, south-east of Cannanore. Forests in and around Mananthavady are among the richest and most dense in Kerala. It has a great historic importance, since this is the resting place of the great Pazhassi Raja who fought against the British.

Pakshipathalam

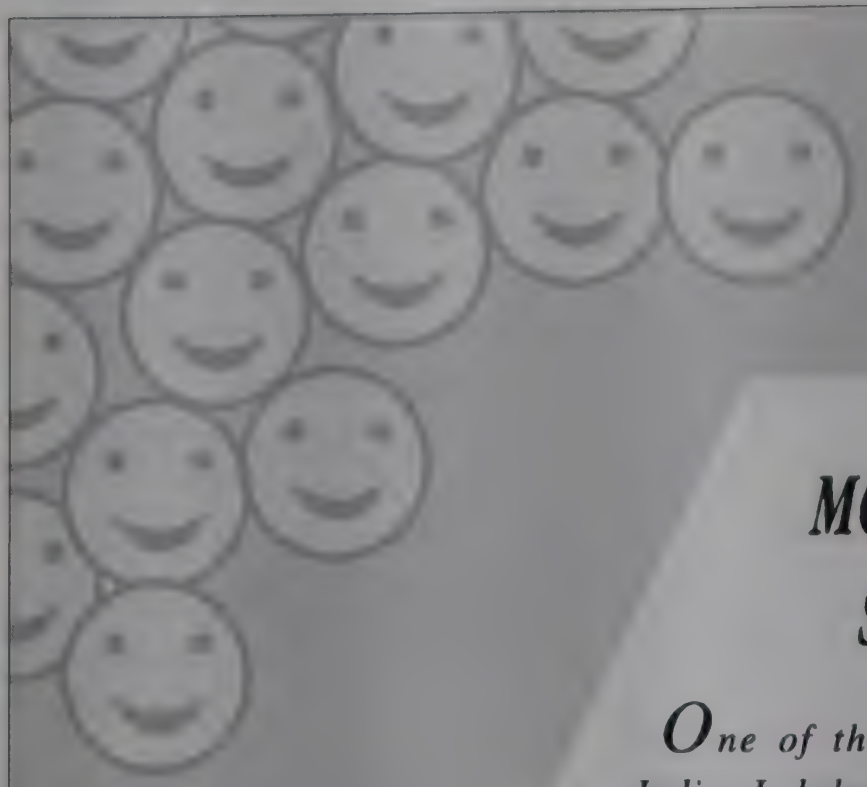
Pakshipathalam, an important bird-watching centre, is located 20 km from Thirunelli. Rare species of birds can be seen from the place's watch tower. There is also a cave believed to have been used by hermits for meditation.

Park of Pazhassi Raja

This celebrated abode of eternal bliss of the great Pazhassi Raja is in Mananthavady. There is also a park built to honour the memory of the king.

Muthanga Wildlife Sanctuary

Also known as the Wynad Sanctuary, Muthanga is about 15 km away from Sultan Battery. The Sanctuary provides home for a diversity of animals like elephant, bear, deer and wild pig. ❑



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EXPORTERS PROFILE

Ishwar Singh
Managing Director

SATYA CASHEW CHEMICALS PVT. LTD

Regd Office : No. 16 & 17, 8th Street, Lakshmi Nagar,
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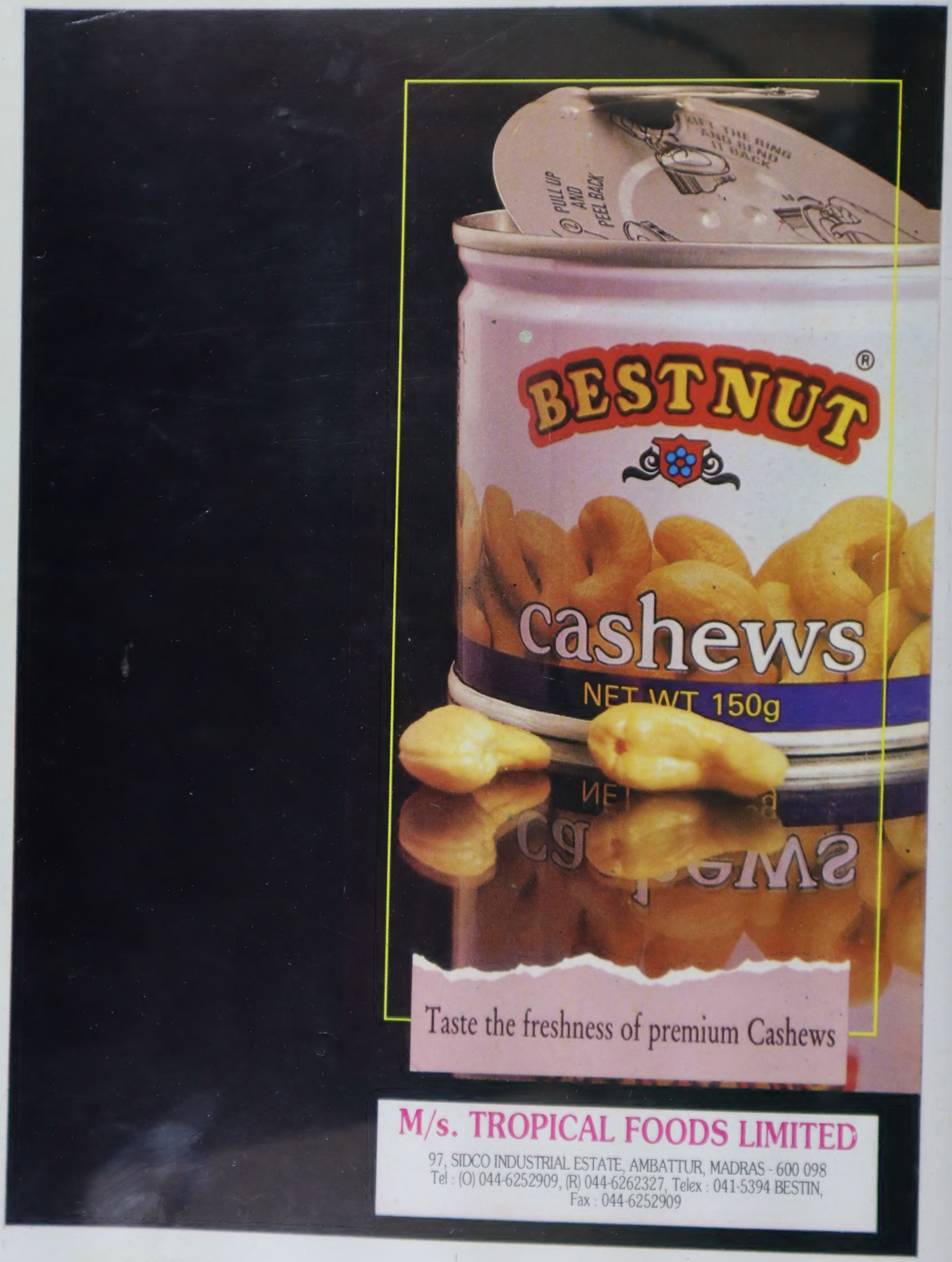

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